Honeywell

Miniature SMT Low Pressure Sensors with Wet/Wet Differential

24PC Series, Uncompensated/Unamplified

1 psi to 15 psi

Datasheet

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 ±1 psi to ±15 psi and have an operating temperature range of -40 ºC to 85 ºC [-40 ºF to 185 ºF]. 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

24PCXXSMT

24PCXXSMTA

24PCXXSMTC

WET/WET CAPABILITY • MEDIA COMPAIBILITY • 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 ºC TO 85 ºC [-40 ºF TO 185 ºF]

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

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

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[1]

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[2]	–	–	1	ms	2

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

[2]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: without EPDM seals with EPDM seals	 -40 °C to 85 °C [-40 °F to 185 °F] -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.

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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 (Best Fit Straight Line, P2>P1)	±0.15	±0.4	±0.1	±0.2	±0.1	±0.3	%span	3
Null shift (0 °C to 25 °C; 25 °C to 50 °C)	±1.0	–	±1.0	–	±1.0	–	mV	4
Span shift (0°C to 25°C; 25 °C to 50 °C)	±5.0	–	±5.0	–	±5.0	–	%span	5
Repeatability and hysteresis	±0.2	–	±0.1	–	±0.2	–	mV	6
Overpressure	–	20	–	20	–	45	psi	7

[1] 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).

[2] The output signal obtained when zero pressure is applied to all available ports.

[3] 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).

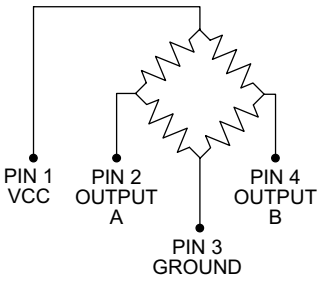
[4] The maximum deviation in offset due to changes in temperature over the compensated temperature range, relative to offset measured at a reference temperature of 25 °C.

[5] 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.

[6] 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.

[7] 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" deceases as P2 pressure increases.

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

24PC Series, Uncompensated/Unamplified

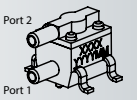
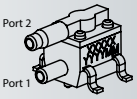
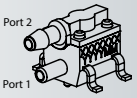
Figure 2. Nomenclature and Order Guide[1]

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.

24PC	01SMT	A
Product Series	Pressure Range	Port Configuration

24PC Series
Miniature SMT
Low Pressure
Sensors with Wet/Wet
Differential Sensing,
Uncompensated/
Unamplified

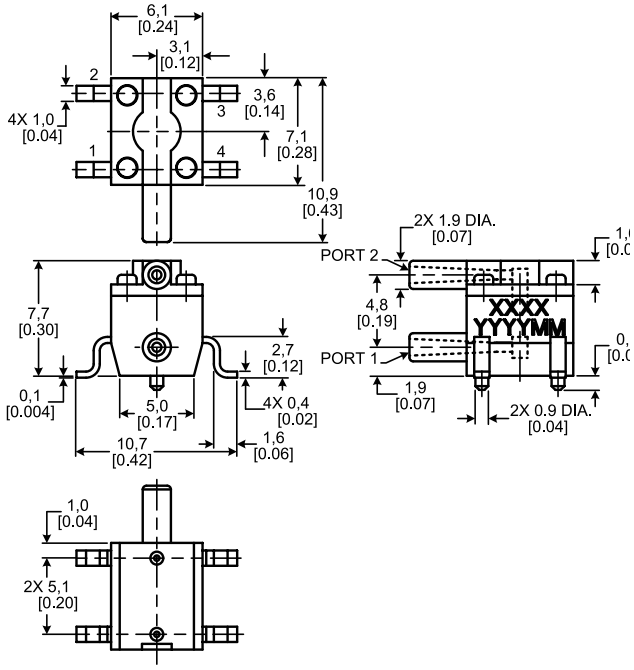
01	1 psi
05	5 psi
15	15 psi

–	Port 1: Standard Port 2: Standard	
A	Port 1: Standard Port 2: Special	
C	Port 1: Standard Port 2: Barbed	

[1]Every combination may not be possible. Contact customer service.

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

24PCXXSMT



24PCXXSMTA

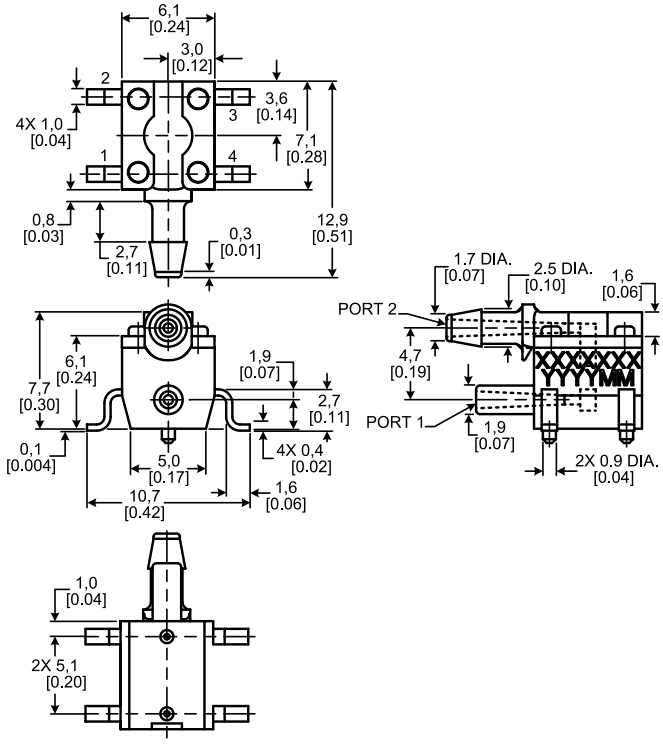


Figure 3. Mounting Dimensions (continued)

24PCXXSMTC

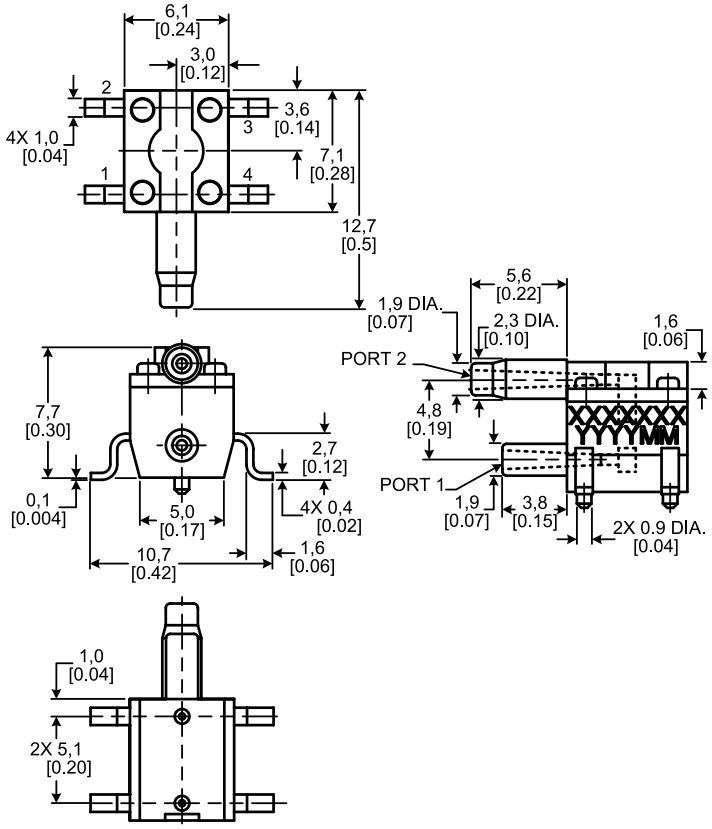
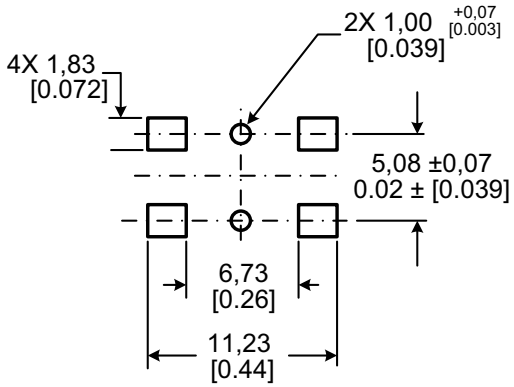


Figure 4. Recommended Land Pattern (For reference only: mm/[in].)



ADDITIONAL INFORMATION

The following associated literature is available at sensing.honeywell.com:

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

⚠ 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.

WARRANTY/REMEDY

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 other 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.**

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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.

Find out more

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

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