Honeywell

Application Note

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_2O to ±150 psi
Millivolt Analog Output

Background

Honeywell's TruStability® TSC Series and NSC Series are piezo-resistive 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 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.

Solutions

POTENTIAL MEDICAL APPLICATIONS

Pneumatic control applications have a flow or pressure generation source, a compressor or pump, that is used in conjunction with valves to control actuators in a wide variety of medical equipment.

The pressure sensors are used for both monitoring and control of pneumatic flow and system pressure for more precise and efficient performance

Some of the pneumatic circuits prevalent in medical applications are:

- **Respiratory breathing circuits:**
  - Nebulizers (Figure 1)
  - Spirometers (Figure 2)
  - Patient monitoring equipment (Figure 3)
- **Flow/pressure control:**
  - Therapeutic hospital beds (Figure 4))
- **Gas collection/delivery:**
  - hospital gas supply (Figure 5)
  - oxygen concentrators (Figure 6)
- **Precise sampling/gas flow:**
  - Blood analysis (Figure 7)
  - Gas chromatography (Figure 8)
  - Analytical instrument sampling systems (Figure 9)

Figure 1. Nebulizer

Figure 2. Spirometer

Figure 5. Hospital gas supply

Figure 3. Patient monitoring equipment

Figure 6. Oxygen concentrator

Figure 4. Therapeutic hospital bed

Figure 7. Blood analysis

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NSC Series, Uncompensated/Unamplified

Figure 8 Gas chromatography

Figure 9. Analysis instrument sampling systems

POTENTIAL INDUSTRIAL APPLICATIONS

Pneumatic control applications have a flow or pressure generation source, a compressor or pump, that is used in conjunction with valves to control actuators in a wide variety of industrial components and systems.

Some pneumatic pumps, valves, and actuators contain integrated pressure sensors. Pressure sensors are also placed throughout other points of the pneumatic circuit in many industrial systems.

Analytical devices for weather, air quality, and contaminants also make use of pneumatic controls for consistent and accurate sampling.

In these industrial systems, the pressure sensors are used for both monitoring and control of pneumatic flow and system pressure for more precise and efficient performance.

Some of the pneumatic circuits prevalent in industrial applications are:

- **Pneumatic components:**
  - Valves, pumps and actuators (Figure 10)
- **Pneumatic Systems;**
  - HVAC Transmitters (Figure 11)
  - Automated pneumatic assembly equipment (Figure 12)
  - Pneumatic operator control systems (Figure 13)
- **Gas collection/delivery:**
  - Industrial gas supply (Figure 14)
- **Precise sampling/gas flow:**
  - Barometry (Figure 15)
  - Gas chromatography (Figure 16)
  - Analytical instrument sampling systems (Figure 17)

Figure 10. Valves, pumps and actuators

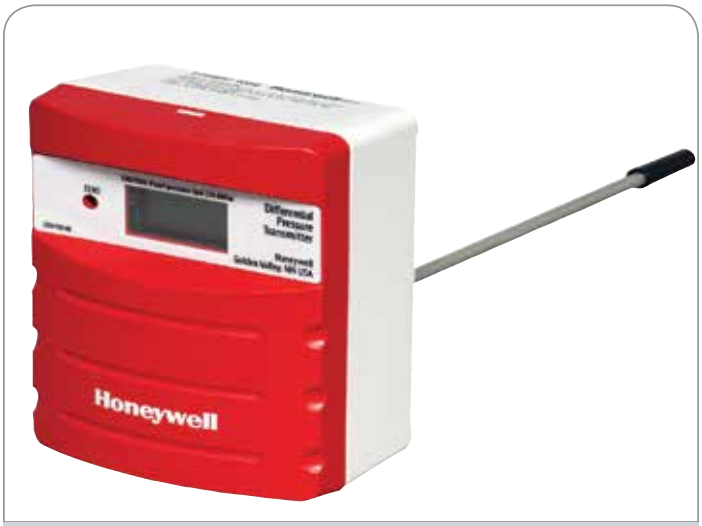

Figure 11. HVAC transmitters

Figure 12. Automated pneumatic assembly equipment

Figure 13. Pneumatic operator control systems

Figure 14. Industrial gas supply

Figure 15. Barometry

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Photo courtesy of Wikipedia

Figure 16. Gas chromatography

Figure 17. Analytic insturment sampling systems

Application Note

TruStability® Board Mount Pressure Sensors

TSC Series and NSC Series	Features and Benefits
	• **Industry-leading long-term stability:** Even after long-term use and thermal extremes, these sensors perform substantially better relative to stability than any other pressure sensor available in the industry today: - Minimizes system calibration needs and maximizes system performance. - Helps support system uptime by eliminating the need to service or replace the sensor during its application life. • **Industry-leading accuracy:** Extremely tight accuracy down to ±0.15 %FSS BFSL: - Reduces software needed to correct system inaccuracies, minimizing system design time. - Supports system accuracy and warranty requirements. • **Industry-leading flexibility:** - Modular, flexible design with numerous package styles, pressure ports, and options simplifies integration into the device manufacturer's application. - Single side wet media option allows the end customer to use one port of the sensor with condensing humidity or directly with non-corrosive liquid media. • **Insensitive to mounting orientation:** Allows flexibility of use within the application. • **Small size:** Miniature 10 mm x 10 mm [0.39 in x 0.39 in] package is very small when compared to most board mount pressure sensors: - Occupies less area on the PCB. - Typically allows for easy placement on crowded PCBs or in small devices. • **Repeatability:** Provides excellent repeatability, high accuracy and reliability under many demanding conditions. • **Supports lean manufacturing:** - J-STD-020-D MSL 1 unlimited shelf life after packaging is opened. - System can be calibrated within one hour after reflow solder. - Compatible with modern lead-free and no-clean solder processes. • **Extremely low power consumption:** - Operating supply voltage as low as 1.5 Vdc. - Reduces power consumption, provides extended battery life, and promotes energy efficiency. • **Absolute, differential and gage types:** - Provides flexibility of use within the application. - Absolute type on NSC Series only. • **Pressure ranges from ±2.5 Mbar to ±10 bar | ±250 Pa to ±1 MPa | ±1 inH_2O to ±150 psi:** Optimizes the customer's system performance by maximizing pressure resolution with more available pressure ranges. • **RoHS and ISO9001 compliance**

Find out more

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

Sensing and Control
Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422
honeywell.com

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