

Application Note

Model DPS Digital Pressure Sensors with CANopen® for Transportation, Industrial, Medical, and Aerospace

Background

Design engineers are frequently challenged with monitoring and/or controlling processes, lines, hoses, equipment, and systems over extended areas. This application note will discuss these challenges relative to analog and CANopen® communication systems.

Analog Systems – When using a standard pressure transducer to control or monitor these elements, engineers utilizing a separate and individualized analog system are limited by cable runs and have cumbersome methodology to interpret the collected data. Analog systems have a limited range of cable; degradation in performance occurs at longer lengths. In addition, they require individual interfacing modules as each sensor is independent and isolated.

CANopen® Systems – There is a more efficient alternative to analog systems: CANopen®, a standardized communication protocol that is characterized by CAN (Controller Area Network) with flexible configuration capabilities. It provides a reliable transmission of data, thus increasing the uptime of machines or equipment. CANopen® provides real-time information and is used in various applications from building automation, transportation, and medical equipment to industrial machines and handling systems.

Engineers utilizing digital pressure transducers with CANopen® can monitor and/or control extended lengths of cable, effectively use and interpret the data collected, and possess the ability to control the protocol that organizes and manipulates the data effectively. CANopen® systems have an extended cable length capability with no performance degradation. There's only one interface so all pressure sensors utilizing CANopen® go through the main interface that controls each individual sensor from one main control point. (See Figure 1).

Another benefit to CANopen® standardized communication is the compatibility with devices and systems from various manufacturers.

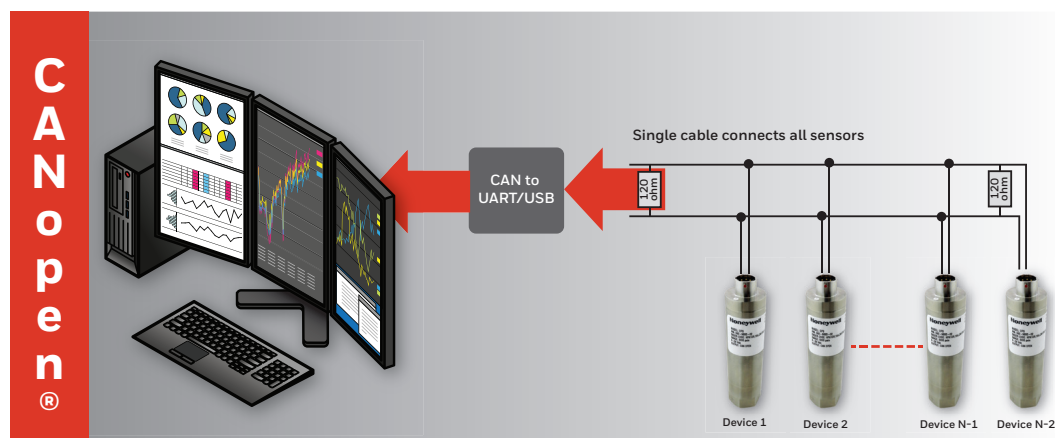


Figure 1. CANopen® Communication System

Solutions

Honeywell's Digital Pressure Sensors with CANopen®, Model DPS general purpose pressure sensors, are configured with a variety of features and options for use in a wide range of demanding applications. Model DPS pressure sensors are rugged, stainless steel, all-welded devices designed to work with a variety of media, and are built to provide consistent performance in harsh transportation, industrial, medical, and aerospace.

Pressure transducers with CANopen® allow for use and interpretation of the collected data, and help operators to manipulate the data more efficiently.

Transportation

Agricultural equipment

May be used to monitor hose lines in farm sprinklers or water irrigation systems to detect for leaks and maintain water pressure. Sprinklers and irrigation systems have extended runs of hose, cables, and overall length that make the use of CANopen® pressure sensors especially important to provide accurate and reliable use.

Automotive test benches

May be used during the vehicle manufacturing process to disperse fluid or in the filling process of various fluids, such as oil, transmission, brake, and windshield washer.

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Construction equipment

May be used to monitor pressure and indicate leak detection in hydraulic lines, vacuum hoses, and different parts of heavy-duty construction equipment including hydraulics, braking system, and fuel tank levels.

Rail equipment testing

May be used to control pneumatic actuation for mass-transit rail's brake lines (subways, above ground/underground trains, freight and passenger trains). In stations/docking areas, equipment has a pressure sensor embedded near or on the tracks that will trigger as it senses a train coming into the station. These sensors trigger the brakes' actuation or deactuation. In addition, sensors may be implemented in the tracks to initiate the brakes to slow down the car.

Train communication network

May be used to link multiple locations to the same line. Embedded pressure sensors used onboard or linked to the overall train system allow engineers to view parameters or communicate across multiple locations or one specific network.

Industrial

General process control and factory automation/equipment

May be used during an assembly or automated process to monitor different pressures for multiple control or go/no-go processes. For example, sensors trigger the equipment to start or stop filling based on the recorded pressure. In addition, sensors with CANopen® can aid in quality assurance or validation of continuous monitoring used to control manufacturing actions or processes. Through the use of CANopen®, multiple stations, buildings, and locations can be simultaneously monitored from one main local control point.

HVAC

May be used in blowers, chillers, cooling towers, and pumps to monitor system performance for proper environmental control and personal comfort in large industrial settings.

Injection/blow molding machines

May be used to monitor the amount of pressure forced into the injection. Pressure is monitored for even flow and to prevent bursting from too much pressure. CANopen® pressure sensors easily control material dispensing or forming.

Packaging machines

May be used during food packaging to monitor bag inflation, nitrogen purging, leak detection, or sealing integrity. For example, transducers monitor pressure as the bag/pouch is filled; once a specific pressure is reached, the machine stops either sealing or filling the bag.

Semiconductor manufacturing

May be used for process control during the manufacturing process (grinding, cleaning, etc.) of silicon wafers. Through measurement of air line pressure, sensors provide mechanism control during grinding with go/no-go feedback to stop the process if there's a manufacturing problem, thereby, reducing scrap as the sensors stop the process.

Medical

Blood dialysis

May be used to monitor fluids and pressure in the dialysis lines. When located in a fresh dialysate cartridge, CANopen® sensors may be used to monitor pressure in the flexible tubing that carries blood or dialysate to provide continuous feedback of line pressures and pump control. In addition, they may be used to obtain a direct, in-line continuous dialysate and venous pressure measurement in the dialysis membrane without interrupting flow.

Equipment systems (i.e., X-ray collimator, MRI scanning, etc.)

May be used to control the processes in medical equipment systems by monitoring air lines and hoses for fluid or air dispensing. In addition, transducers with CANopen® can monitor for leaks or overpressure that lead to damage or overdispensing.

Aerospace

Test and research labs

May be used to provide design validation. CANopen® pressure sensors provide the ability to run multiple scenarios simultaneously from the same control point, such as testing an air wing by monitoring multiple parameters at once. Sensors can measure load, temperature, and pressure in one scenario. CANopen® provides design flexibility to interlink multiple pressure sensors with other parameters rather than as independent systems.

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Features and Benefits

Configurable

- Choice of pressure types, accuracy levels, pressure ranges, pressure connections, and electrical terminations allow customers the ability to configure the devices to meet their specific application needs
- Wide pressure range and units [10 psi to 10K psi or 1 bar to 700 bar or 70 kPa to 70000 kPa] provide support for many unique applications
- Configure the update rate between 10 Hz to 250 Hz
- 5-pin M12 connector options allow for use in industrial applications, while 6-pin Bendix option allows for use in transportation applications



Accurate

- Accuracy options of ≤ 30 psi, ± 0.25 %FS or >30 psi, ± 0.1 %FS or ± 0.25 %FS allow customers to select the accuracy level required for their application
- Customers can select the accuracy level required for their application. Additionally, Honeywell specifies Total Error Band ± 2 %FS, the most comprehensive, clear, and meaningful measurement that includes nonlinearity, repeatability, hysteresis and temperature error

Total Error Band [± 2 % FS]

- Honeywell specifies Total Error Band (TEB), the most comprehensive, clear, and meaningful measurement that includes nonlinearity, repeatability and hysteresis, as well as temperature error

Find Out More

To learn more about Honeywell sensors and switches, contact a Honeywell representative today at **1-800-537-6945**, e-mail **info.sc@honeywell.com**, or visit **sensing.honeywell.com**

Rugged and Durable

- All-welded, 300 series stainless steel and Hastelloy® design allow for use in a wide range of harsh environments
- Mechanical shock rating of 100 G/11 ms and IP65 rating allow for use in harsh environments

CiA (CAN in Automation) certified

CANbus with CANopen® protocol communications

Allows customers to:

- Connect to longer cable distances without sacrificing accuracy
- Reduce the amount of wires that need to be connected to the system, simplifying installation
- Mitigate data corruption
- Simplify tracking each networked pressure sensor by using unique serial numbers
- Configure the update rate between 10 Hz to 250 Hz

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.

Honeywell Sensing and Productivity Solutions

9680 Old Bailes Road
Fort Mill, SC 29707
honeywell.com

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