Honeywell

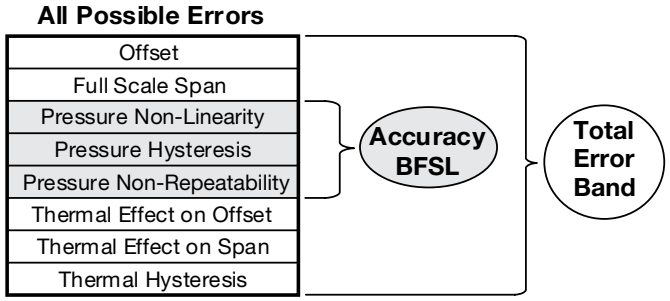
Application Note

Heavy Duty Pressure Transducers, PX2 Series and PX3 Series

Background

Honeywell's PX2 Series and PX3 Series Heavy Duty Pressure Transducers are a portfolio of highly configurable pressure sensors that use piezoresistive sensing technology with ASIC (Application Specific Integrated Circuit) signal conditioning in a metal housing. These products are fully calibrated and compensated for offset, sensitivity, temperature effects and non-linearity using the on-board ASIC. The Total Error Band, which provides the most comprehensive, clear, and meaningful specification of the sensor's measurement performance, is ±2 %FSS (40 ºC to 125 ºC [-40 °F to 257 °F]) for the PX2 Series and ±1 %FSS (-20 °C to 85 °C [-4 °F to 185 °F]) for the PX3 Series. (See Figure 1.)

Figure 1. TEB Definition



Pressure ranges are 1 to 70 bar | 100 kPa to 7 MPa | 15 psi to 1000 psi for the PX2 Series and 1 bar to 46 bar | 15 psi to 667 psi for the PX3 Series. All products are designed and manufactured according to ISO 9001 standards and are RoHS and CE compliant.

Solutions

With thousands of possible configurations, the PX2 Series and PX3 Series allow Honeywell to meet customer requirements and quickly provide the preferred options for the application. They are compatible with a variety of harsh media including brake fluid, common hydrofluorocarbon refrigerants, next generation low global warming potential (GWP) refrigerants, engine oil, water, hydraulic fluids, and compressed air. The wide operating temperature range, ingress protection, and radiated immunity allow for reliable performance in tough environments.

These transducers measure absolute, sealed gage, or vented gage pressure (PX2 only for vented gage). The absolute versions have an internal vacuum reference and an output value proportional to absolute pressure, the sealed gage versions have the offset calibrated at 14.7 psiA, and the vented gage versions measure pressure with respect to ambient pressure. (See Table 1.)

POTENTIAL APPLICATIONS

INDUSTRIAL

HVACR

May be used to monitor system performance for proper environmental control of:

- Compressors:
  - Inlet and outlet pressure
  - Oil pressure
  - Rack rooms
- Refrigerant recovery systems
- Rooftop chillers

AIR COMPRESSORS

May be used to monitor compressor performance and efficiency, specifically:

- Filter pressure drop
- Inlet and outlet pressure
- Oil pressure
- Pumps

GENERAL

May be used to monitor air and fluid pressure in:

- Cooling water inlet and outlet pressure
- Factory automation
- Flow and level
- Fluid power
- Injection molding knock-out valves
- Lasers
- Pneumatics
- Solar energy
- Sprayers
- Valves

TRANSPORTATION

- Air system monitoring
- Air brakes
- Cooling systems
- Engine oil
- Hydraulic oil pressure monitoring
- Manifold absolute pressure (MAP)

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Table 1: PX2 Series and PX3 Series Comparison

Characteristic			Comments
	PX2 Series	**PX3 Series**	
Operating, compensated, storage temperature range	-40 °C to 125 °C [-40 °F to 257 °F]		PX2 and PX3 have the same broad temperature range
Total Error Band	• ±2 %FSS from -40 °C to 125 °C [-40 °F to 257 °F]	• ±1 %FSS from -20 °C to 85 °C [-4 °F to 185 °F] (optimal) • ±2 %FSS below -20 °C [<-4 °F] and above 85 °C [185 °F]	PX3's smaller error permits systems to run more efficiently; energy efficiency minimizes energy costs
Pressure range	• 1 bar to 70 bar • 15 psi to 1000 psi • 100 kPa to 7 MPa	• 1 bar to 46 bar • 15 psi to 667 psi	PX2's wide pressure range and more pressure reference options accommodate diverse applications
Pressure reference	• absolute • sealed gage • vented gage	• absolute • sealed gage	
Port material	stainless steel 304	brass C36000 (Pb content: 3.7% max.)	PX3 has a brass pressure port for price-sensitive applications; PX2's many common pressure port and electrical connector types provide flexibility to accommodate application and regional diversity (See product datasheet for latest pressure port and electrical connector offerings.)
Pressure port type	• 7/16-20 UNF 1/4 in 45° Flare Female Schrader • 7/16-20 UNF 45° Flare Male • 7/16-20 UNF 37° Flare Male • G1/4 • G1/8 • M12 x 1.5 • 1/4-18 NPT • 1/8-27 NPT • 9/16-18 UNF • 7/16-20 UNF	• 7/16-20 UNF 1/4 in 45° Flare Female Schrader • G1/4 • M12 x 1.5 • 1/4-18 NPT • 1/8-27 NPT	
Electrical connector type	• Metri-Pack 150 (UL 94 HB or V-0) • Micro M12 • DIN • Deutsch • cable harness (1 m, 2 m, 3 m, or 5 m)	• Metri-Pack 150 (more options coming soon)	
Output transfer function	• ratiometric 5.0 V: 10 %Vs to 90 %Vs • ratiometric 5.0 V: 5 %Vs to 95 %Vs • ratiometric 3.3 V: 10 %Vs to 90 %Vs • ratiometric 3.3 V: 5 %Vs to 95 %Vs • regulated: 1 Vdc to 6 Vdc • regulated: 0.25 Vdc to 10.25 Vdc • regulated: 0.5 Vdc to 4.5 Vdc • regulated: 1 Vdc to 5 Vdc • current: 4 mA to 20 mA	• ratiometric: 0.5 Vdc to 4.5 Vdc (4 mA to 20 mA coming soon)	PX2's wide range of output transfer functions facilitates system integration; 3.3 Vdc low power option
EMC (Radiated Immunity)	100 V/m per ISO 11452-2	200 V/m per ISO 11452-2	PX3's high radiated immunity provides durable signal output near wireless signals and antennas

Table 1: PX2 Series and PX3 Series Comparison (continued)

Characteristic	PX2 Series	PX3 Series	Comments
Insulation resistance	not specified	>100 MOhm at 1500 Vdc	PX3's high insulation resistance helps protect operator and sensor from hazardous current
Dielectric strength	not specified	>1500 Vac for 1 minute or 1800 Vac for 1 second	PX3's high dielectric strength helps protect operator and sensor from hazardous current
Ingress protection	IP65, IP67, IP69K (depends on electrical connector type)	IP67	PX2 and PX3's high ingress protection allows sensor to perform reliably in wet or moist environments
External freeze/thaw resistance	not specified	>6 cycles from -30 °C to 50 °C [-22 °F to 122 °F]	PX3's resistance against external frost prevents operation down time and minimizes maintenance costs
Media compatibility	• common HFC refrigerants (e.g. R410A) • low GWP refrigerants (e.g. R32, R1234ZE) • engine oil, brake fluid, hydraulic fluid • saline (1%), potable water	• common HFC refrigerants (e.g. R410A) • low GWP refrigerants (e.g. R32, R1234ZE) • engine oil, brake fluid, hydraulic fluid • saline (1%)	PX2 and PX3 support wide variety of applications such as HVAC/R, air compressor, MAP, and pneumatic systems

Find out more
To learn more about Honeywell Sensing and Productivity Solutions' 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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