

P2100 Series

Differential Pressure Transducer

The P2100 series of transducers is designed for differential pressure measurement of wet and/or corrosive fluids. There is a range of models with full range pressure from 10 psi D to 3,500 psi D. Common line pressures up to 5000 psi can be accommodated with minimal effect on the output and each port is equipped with overpressure protection (up to 5 times range on P1). A selection of electrical outputs is available from 20 mV to 4-20 mA two wire the latter having the option of BASEEFA approval.

The P21X1 to P21X4 series is designed for use with fluids which can deposit some form of residue within a cavity and therefore the pressure ports can be removed for cleaning.

The P21X6 to P21X9 series is an all welded construction with the wetted ports made from Hasteloy C-276. This instrument is designed to handle highly corrosive fluids but also has applications where size and weight are at a premium.



Features

- Differential measurement of corrosive fluids**
- Bi-directional differential pressure (calibrated option)**
- High overload protection in either direction**
- Low and high level output**
- Removable pressure ports**
- 2 wire 4-20 mA option BASEFA and CENELEC approval class EEx ia IIC T4 ($T_{amb}=60^{\circ}C$)**



Environmental (all models)

Temperature Compensated

Range 32°F to 185°F (0°C to 85°C)

Operating Temperature Range

High Range -22°F to 248°F (-30 to 120°C)

Medium Range -5°F to 212°F (-20 to 100°C)

Storage Temperature -22°F to 266°F (-30 to 130°C)

Humidity

Cable Outlet Immersible to 100 ft (30.5 m)

Connector Outlet 95% relative humidity

Mechanical Natural Frequency

High Range Approx. 4 kHz for 75 psi (5.0 bar) up to 15 kHz for 1000 psi (70 bar)

Medium Range Approx. 2 kHz for 10 psi (0.7 bar) up to 3.0 kHz for 25 psi (1.7 bar)

Steady Acceleration

and Linear Vibration $\leq 0.5\%$ F.R.O./g for 10 psi (0.7 bar) decreasing to less than 0.02% F.R.O./g for 500 psi (35 bar) and above.

Frequency range 0-2 kHz at 20g max. limited to 8mm double amplitude

Shock 1000g for 5 milliseconds in any axis will not damage the sensor.

Altitude -150 feet to +70,000 feet without damage

Insulation Resistance 500 Megohms at 50 VDC @ 25°C

P2100 Series

Pressure Ranges: 0-10 to 3500 psi

(0-0.7 to 250 bar)

Accuracy: $\pm 0.35\%$ F.R.O.**Specifications by Model @ 77°F (25°C)**

| Model Number | P2101/9 | P2141/9 | P2151/9 | P2161/9 | P2181/9 | P2191/9 |
|--|--|---|---|---|-------------------------------------|-----------------------------------|
| Input Voltage | 10 VDC (12 V max) | 10 VDC (12 V max) | 11-18 VDC | 18-36 VDC | 10-36 VDC | ± 15 VDC |
| Resistance | 350 ohm $\pm 5\%$ | | | | | |
| Current | 30 mA | 30 mA | 30 mA | 35 mA | — | +30/-2 mA |
| Output | | | | | | |
| Unidirectional | | | | | | |
| 0-0.7 bar | 20mV to 25mV | 0-2.5V $\pm 2\%$ | 0-2.5V $\pm 2\%$ | 0-2.5V $\pm 2\%$ | 16 mA $\pm 2\%$ | — |
| 0-1 bar & above | 25mV $\pm 2\%$ | 0-2.5V $\pm 2\%$ | 0-2.5V $\pm 2\%$ | 0-2.5V $\pm 2\%$ | (4-20 mA) $\pm 2\%$ | 0-5V $\pm 2\%$ |
| Bidirectional | | | | | | |
| ± 0.7 bar | ± 10 mV min. | ± 2.5 V $\pm 2\%$ | ± 2.5 V $\pm 2\%$ | ± 2.5 V $\pm 2\%$ | 4-20 mA $\pm 2\%$ | — |
| ± 1 bar & above | ± 12.5 mV $\pm 2\%$ | ± 2.5 V $\pm 2\%$ | ± 2.5 V $\pm 2\%$ | ± 2.5 V $\pm 2\%$ | (16 mA) $\pm 2\%$ | ± 5 V $\pm 2\%$ |
| Resistance (ohm) | 350 $\pm 5\%$ | <10 | <10 | <10 | — | <10 |
| Current mA (max) | 10 mA | 5 mA | 5 mA | 5 mA | — | 5 mA |
| Load Resistance | | | | | 0 at 10V to 1300 ohm at 36V | |
| Residual Unbalance(FRO) | $\pm 2\%$ | $\pm 2\%$ | $\pm 2\%$ | $\pm 2\%$ | $\pm 2\%$ | $\pm 2\%$ |
| Accuracy: Combined Non-Linearity Hysteresis and Non-Repeatability | | | | | | |
| Thermal Zero Shift | $\leq \pm 0.015\%$ FRO/ $^{\circ}$ C $\leq \pm 0.015\%$ FRO/ $^{\circ}$ C of total BD output on BD option | $\pm 0.35\%$ FRO (BSL) | $\pm 0.35\%$ FRO (BSL) | $\pm 0.35\%$ FRO (BSL) | $\leq \pm 0.02\%$ FRO/ $^{\circ}$ C | Each port separately on BD option |
| Thermal Sensitivity Shift | $\leq \pm 0.015\%$ FRO/ $^{\circ}$ C $\leq \pm 0.15\%$ FRO/ $^{\circ}$ C of total BD output on BD option | $\leq \pm 0.02\%$ FRO/ $^{\circ}$ C of total BD output on BD option | $\leq \pm 0.02\%$ FRO/ $^{\circ}$ C of total BD output on BD option | $\leq \pm 0.02\%$ FRO/ $^{\circ}$ C of total BD output on BD option | $\leq \pm 0.02\%$ FRO/ $^{\circ}$ C | |
| Weight oz (gm) | | | | | | |
| P21X1/4 | 35.7 (1000) | 35.7 (1000) | 35.7 (1000) | 35.7 (1000) | 35.7 (1000) | 35.7 (1000) |
| P21X6/9 | 18.9 (530) | 18.9 (530) | 18.9 (530) | 18.9 (530) | 18.9 (530) | 18.9 (530) |

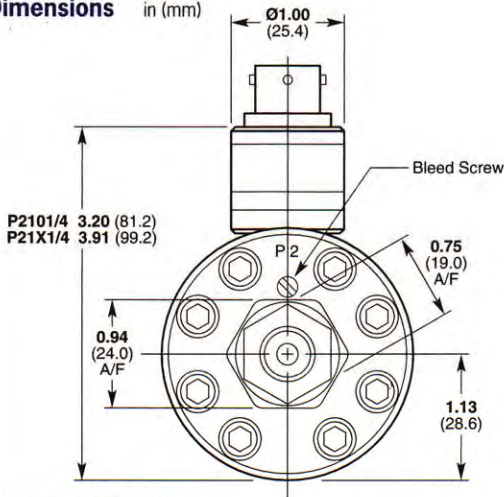
Common Specifications

| | P21X1/4 | P21X6/9 |
|---|--|--|
| Pressure Ranges | | |
| Medium | psi: 10; 15; 25; 35 bar: 0.7; 1.0; 1.5; 2.5 | psi: 10; 15; 25; 35 bar: 0.7; 1.0; 1.5; 2.5 |
| High Range | psi: 75; 100; 150; 250; 500; 1000; 2000; 3500 bar: 5; 7; 10; 20; 35; 70; 150; 250 | psi: 75; 100; 150; 250; 500; 1000 bar: 5; 7; 10; 20; 35; 70 |
| Line Pressure | 3500 psi (250) bar max. standard 5000 psi (350 bar) option | 1500 psi (100 bar) max. |
| Zero Shift with Line Pressure | $\pm 1.0\%$ per 1000 psi (70 bar) Nominal | Individual calibration given. BD options nominally $\pm 1\%$ of combined BD output. |
| Differential Pressure Limit | | |
| P1 | 5x rated pressure or 3750 psi (260 bar) whichever is less | 5x rated pressure or 1500 psi (100 bar) whichever is less |
| P2 | 2 x rated pressure or 3750 psi (260 bar) whichever is less | 2 x rated pressure or 1500 psi (100 bar) whichever is less |
| Differential Burst Pressure | | |
| P1 | ≥ 10 x rated pressure or 5000 psi (350 bar) whichever is less | 10 x rated pressure or 2500 psi (170 bar) whichever is less |
| P2 | ≥ 6 x rated pressure or 4000 psi (275 bar) whichever is less | |
| Pressure Media | Liquids or gases compatible with AIS1300, 17-4 & 17-7 SS and Nitrile "O" rings | Liquid or gases compatible with Inconel 625 and Hastelloy C-276 |
| Sensitivity Imbalance | P2 = P1 $\pm 2.5\%$ ($\pm 1\%$ per 1000 psi) (70 bar) Full Range Pressure | |
| Zero Shift with Alternating Full Range Pressure Cycling (BD) | | |
| Shunt Calibration (not P218x) | | $\pm 0.25\%$ FRO on P1 ($\pm 0.5\%$ FRO on P2) 80% $\pm 5\%$ full range pressure |

P2100 Series

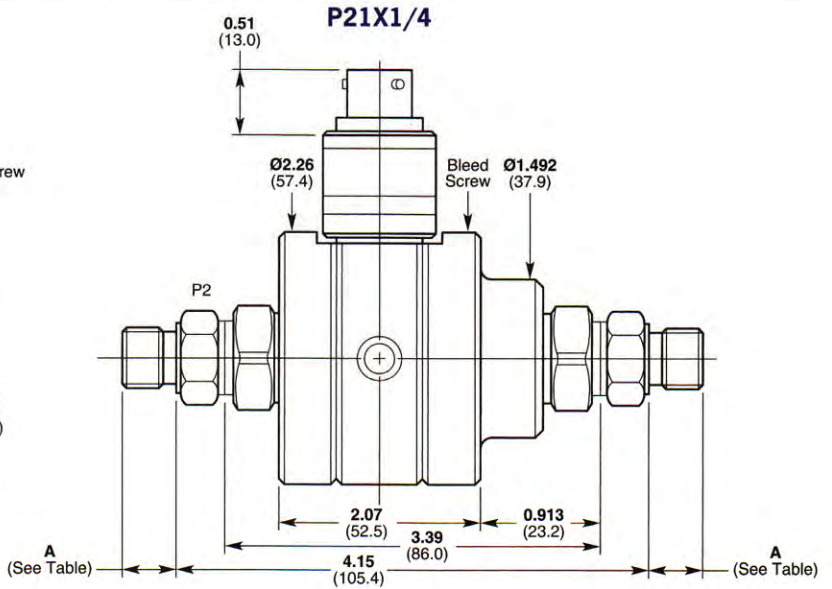
Differential Pressure Transducer Type

Dimensions in (mm)



P21X1/4 Adapters

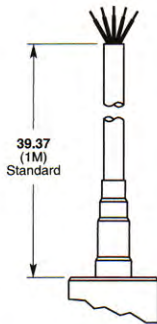
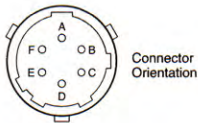
| Thread Size | Code | A in (mm) |
|--------------------|------|--------------|
| 1/4" (BSP) (F) | 0001 | 0.46 (11.9) |
| 1/4" (BSP) (M) | 0002 | 0.45 (11.7) |
| M14 x 1.5 (M) | 0003 | 0.40 (10.2) |
| 7/16"-20UNF-2A (M) | 0004 | 0.55 (14.2) |
| 1/4"-18NPT (M) | 0005 | 0.55 (14.2) |
| M10 x 1.0 (F) | 0006 | 0.38 (9.9) |
| 1/4"-18NPT (F) | 0007 | 0.56 (14.4) |



P21X6/9

P21X6/9 Adapters

| Thread Size | Code | A in (mm) |
|--------------------|------|--------------|
| 1/4" (BSP) (F) | 0001 | 0.46 (11.9) |
| 1/4" (BSP) (M) | 0002 | 0.47 (11.7) |
| M14 x 1.5 (M) | 0003 | 0.55 (14.2) |
| 7/16"-20UNF-2A (M) | 0004 | 0.54 (14.0) |



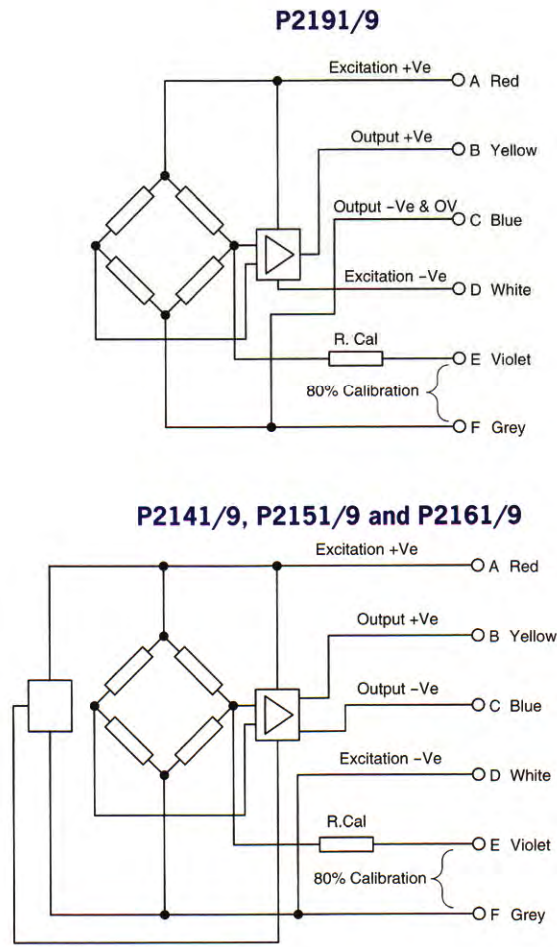
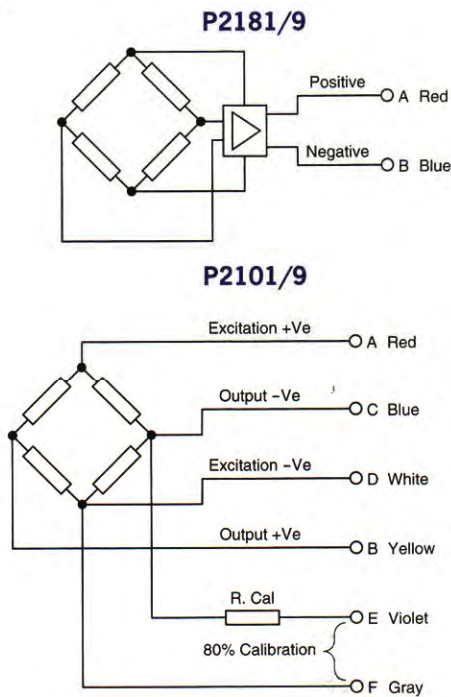
Connections

| Cable | Connector ² |
|---------------------|-----------------------------------|
| Red ¹ | Pin A ¹ Excitation (+) |
| White | Pin D Excitation (-) |
| Yellow | Pin B Output (+) |
| Blue ^{1,2} | Pin C ^{1,2} Output (-) |
| Violet | Pin E } 80% shunt calibration |
| Grey | Pin F } |

¹ 2-wire transmitter connections

² 0 Volt P219X, P218X series

Wiring



Designation and Ordering Information

Specify by transducer Type number, coding, pressure range and UD or BD (UD = Unidirectional, BD = Bidirectional)

Example: P2101-0022, 0-10 bar UD signifies "Pressure transducer, cable outlet and 1/4 BSP male screw in pressure adapter, with metal/nitrile rubber bonded seal, ranged 0-10 bar UD with 0-25mV output from 10 VDC supply.

Type No. & Code P21

| | | | | | |
|---|------------|--|--|--|---|
| <p>0 – 25mV output 4 – 2.5V output (10V supply) 5 – 2.5V output (11-18V supply) 6 – 2.5V output (18-32V supply) 8 – 4-20 mA output (10-36V supply) 9 – 5V output (+15.0-15V supply)</p> | <p>— 0</p> | <p>Intrinsic Safety 0 – Non IS 9 – IS (P2180 only)</p> | <p>0 – Welded adaptor 2 – Screw in adaptor</p> | <p>Unit B: bar P: psi</p> | <p>Pressure Reference UD: uni-directional BD: bi-directional</p> |
| <p>1 – High range – cable outlet 2 – Medium range – cable outlet 3 – High range – connector outlet 4 – Medium range – connector outlet 6 – High range – cable outlet with Inconel wetted parts 7 – Medium range – cable outlet with Inconel wetted parts 8 – High range – connector outlet with Inconel wetted parts 9 – Medium range – connector outlet with Inconel wetted parts</p> | | <p>1 1/4 BSP female 2 1/4 BSP male 3 14 x 1.5 male* 4 7/16 in-20 UNF 2A male* 5 1/4 in-18 NPT male* 6 10 x 1 mm Arsero* Ermeto female 9 1/4 in 18 NPT female* *Inconel only to special order</p> | <p>Pressure Range (Enter full scale pressure range without units) High (bar) 0-5; 7; 10; 20; 35; 70; 150; 250 (psi) 0-75; 100; 150; 250; 500; 1000; 2000; 3500 Medium (bar) 0.7; 1.0; 1.5; 2.5 (psi) 0-10; 15; 25; 35</p> | | |