

P1600 Series

Strain Gauge Pressure Transducer

Schaevitz® P1600 Series Strain Gauge Pressure Transducers are sensors that provide highly precise measurement of wet/dry differential pressures over wide temperature ranges.

Standard versions of this transducer use a 17-4 pH stainless steel diaphragm to sense pressure. The deflection of the diaphragm is transferred to a double cantilever beam by a force transfer rod. Strain in the beam, and therefore, input pressure is measured by four foil strain gauges.

An all-welded construction provides high reliability and stability. Capable of sensing extremely small changes of applied pressure, the transducers are relatively insensitive to vibration, altitude and shock.

The P1600 Series are available in a range of electrical inputs and outputs.



Features

- ☐ **Bi-directional operation**
- ☐ **Operation in high temperatures**
- ☐ **Shock and vibration resistant**
- ☐ **2 wire 4-20 mA option: Intrinsic safety approval to EEx ia IIc T4 ($T_{amb}=60^{\circ}\text{C}$), BASEFA, CENELEC EN50-020**

Applications

- ☐ **Military and commercial aircraft**
- ☐ **Filter blockage detection**
- ☐ **Process control**
- ☐ **Valve/position monitoring**

Specifications by Model @ 77°F (25°C)

Model Number	P1602/4	P1642/4	P1652/4	P1662/4	P1682/4	P1692/4
Input Voltage	10 VDC (12 V max)	10 VDC	11-18 VDC	18-32 VDC	10-36 VDC	±15 VDC
Current	13 mA	20 mA	20 mA	25 mA	—	20 mA
Output (F.R.O.)						
Full Range Output (±1%)						
100 mbar	20 mV	5 VDC	2.5 VDC	5 VDC	4-20 mA	5 VDC
200 mbar & 300 mbar	25 mV	5 VDC	2.5 VDC	5 VDC	4-20 mA	5 VDC
Impedance (ohm)	1000 ±5%	<10	<10	<10	Load Resist. 1300 max. @ 36 VDC	<10
Current mA (max)	—	5	5	5	—	5
Frequency Response	Approx. 1.0 kHz for 100 mbar to approx. 2 kHz for 350 mbar	1 kHz	1 kHz	1 kHz	100 Hz	1 kHz
Combined Thermal Zero & Sensitivity Shift						
% F.R.O./°F	±0.008	±0.008	±0.008	±0.008	±0.008	±0.008
% F.R.O./°C	±0.015	±0.015	±0.015	±0.015	±0.015	±0.015
Residual Unbalance (%FRO)	±1%	±1%	±1%	±1%	±1%	±1%
Weight oz (gm)						
Connector 100 & 200 mbar	14.1 (400)	14.8 (420)	14.8 (420)	14.8 (420)	14.8 (420)	14.8 (420)
Connector 350 mbar	12.0 (340)	12.0 (340)	12.0 (340)	12.0 (340)	12.0 (340)	12.0 (340)

Select P1600 models, when correctly installed, are CE certified to comply with the EMC Directive 89/336/EEC Generic Standards for Residential, Commercial, Light Industrial and Industrial Environments.



P1600 Series
Pressure Ranges: 0-1.5 to 0-5 psi
(0-100 to 350 mbar)
Accuracy: $\leq \pm 0.25\%$ F.R.O.

Common Specifications

Pressure Ranges

Low (psi) 0-1.5; 3.0; 5.0
(mbar) 0-100; 200; 350

Pressure References

All Ranges Uni-directional (UD); bi-directional (BD) optional

Differential Pressure Limit

P1 10x full range pressure. 0-100 mbar; 5x full range pressure. 0-200 and 350 mbar
P2 2x full range pressure. (P1 must always be >P2 pressure)

Line Pressure 20X nominal pressure or 100 psi (7.0 bar) whichever is less

Burst Pressure

P1 >20 x full range pressure
P2 >5 x full range pressure

Zero Shift with

Line Pressure $\leq \pm 0.30\%$ F.R.O. per bar

Pressure Media P1: Liquids or gases compatible with 17-4 pH; P2: Must only be connected to dry gas

Shunt Calibration 80% $\pm 5\%$ full range pressure (not fitted in P1680 Series)

Combined Nonlinearity, Hysteresis

and Nonrepeatability $\leq \pm 0.25\%$ F.R.O. (BSL)

Temperature Range

Operable -65°F to 250°F (-54°C to 120°C)
Compensated 32°F to 212°F (0°C to 100°C)

Storage -65°F to 300°F (-54°C to 150°C)

Humidity

Connector Version 95% Relative humidity

Cable Version Immersible to IP67 (fluid must not enter the ends of the cable)

Acceleration Response

0-100 mbar $\pm 1.0\%$ F.R.O./g nominal
0-200 mbar $\pm 0.5\%$ F.R.O./g nominal
0-350 mbar $\pm 0.4\%$ F.R.O./g nominal

Vibration Surpasses MIL STD810C Method 514-2 Curve L and EUROCAE ED 14A/RTCA 160A

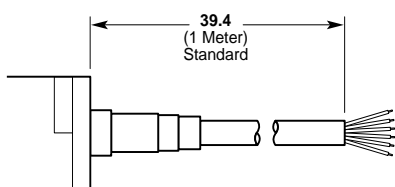
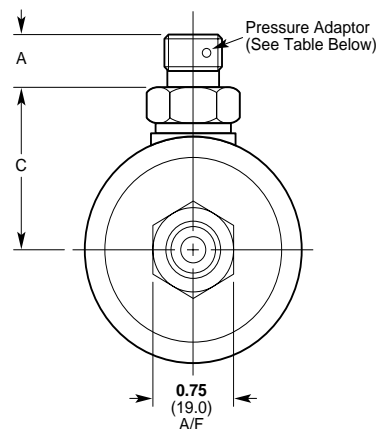
Shock 1000 g for 5 msec will not damage the sensor

EMC The P1640, P1650, P1660, P1680 and P1690 Series are CE marked, and when correctly installed comply with the EMC Directive 89/336/EEC Generic Standards for Residential Commercial, Light Industrial and Industrial environments. Note: The P1680 Series when used in Intrinsic Safety applications does not comply with the Industrial environment directive.

Insulation Resistance 500 Mohm at 50 VDC at 25°C

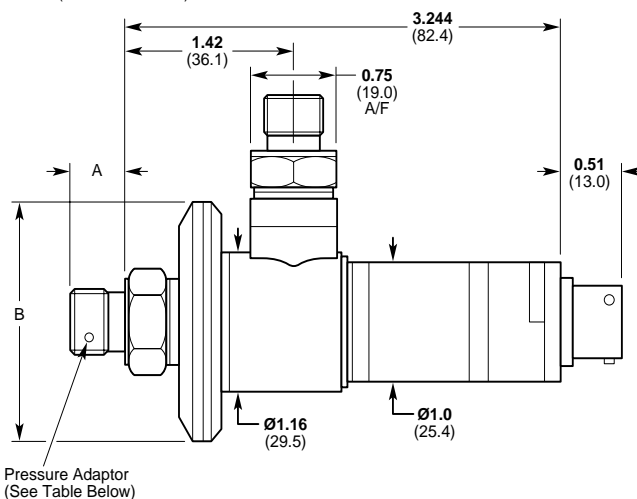
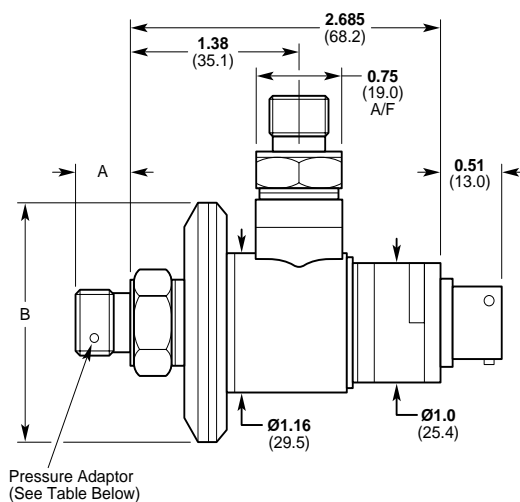
Strain Gauge Pressure Transducer

Dimensions in (mm)



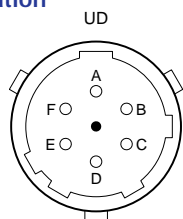
Adapters

Thread Size	Code	Dimensions in (mm)
	Welded	A
1/4" BSP (F)	0001	0.47 (11.9)
1/4" BSP (M)	0002	0.46 (11.7)
M14 x 1.5 (M)	0003	0.40 (10.2)
7/16"-20UNF-2A (M)	0004	0.56 (14.2)
1/4"-18NPT (M)	0005	0.55 (14.0)
M10 x 1.0 (F)	0006	0.39 (9.9)
1/4"-18NPT (F)	0009	0.57 (14.4)



Range	Diameter B in (mm)	Dimension C in (mm)
1.5 psi (100 mbar)	1.976 (50.19)	1.401 (35.75)
3.0 psi (200 mbar)	1.976 (50.19)	1.401 (35.75)
5.0 psi (350 mbar)	1.644 (41.75)	1.226 (31.15)

Connector Orientation



Connections

Cable	Connector ²	
Red ¹	Pin A	Excitation (+)
White	Pin D	Excitation (-) ⁵
Yellow	Pin B	Output (+)
Blue ^{1,3}	Pin C ^{1,2}	Output (-) ⁵
Violet	Pin E	} 80% shunt calibration ⁴
Grey	Pin F	

Note: Screen is connected to the case for CE marked units. Screen is not connected to the case for optional IS units (P1680). IS certification revokes CE certification.

¹ 2-wire transmitter connections (max cable length is 20 meters when I.S.)

2 0 Volt P1690 Series

³ Connected internally for P1640, P1650, P1660 Series (3-wire)

⁴ Shunt calibration not fitted to P1680 Series

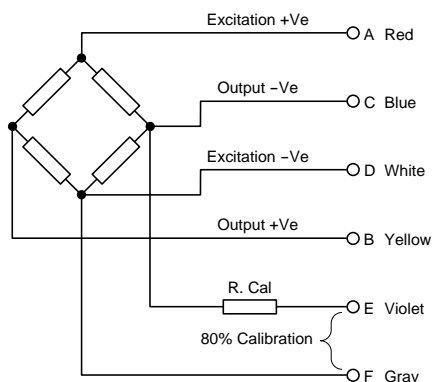
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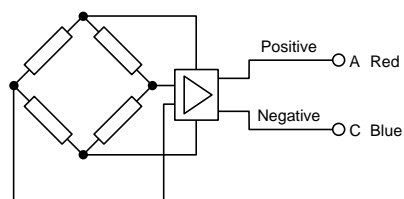
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Wiring

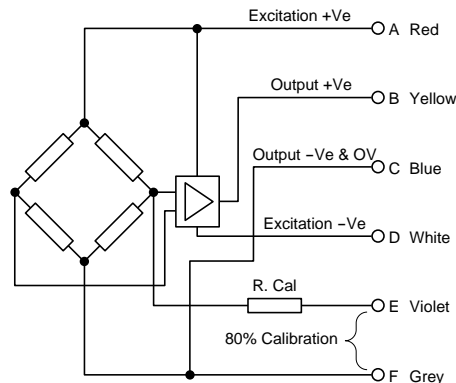
P1602/4



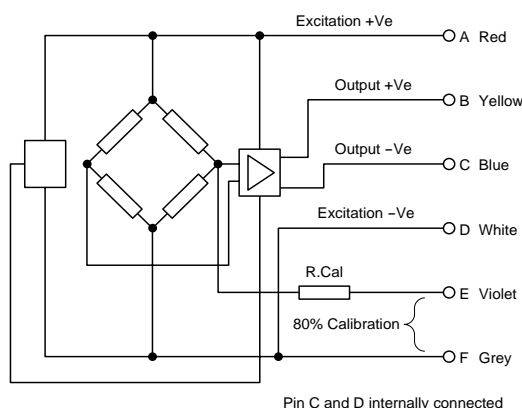
P1682/4



P1692/4



P1642/4, P1652/4 AND P1662/4



Designation and Ordering Information

Specify by transducer Type number, coding, pressure range and UD units and pressure reference.

Example: P1662-0005-10 bar signifies a pressure transducer with a 0 to 5 VDC output operating from 18-32V, cable outlet and 1/4 inch -18 NPT male pressure ports, ranged 0-10 bar, with uni-directional pressure reference.

Type No. & Code P21

0 – 25mV output
4 – 5V output (10V supply)
5 – 2.5V output (11-18V supply)
6 – 5V output (18-32V supply)
8 – 4-20 mA output (10-36V supply)
9 – 5V output (+15.0-15V supply)

Cable/Connector

(Please reference to selected pressure range)
2 – Low Range – cable outlet
4 – Low Range – connector outlet

Intrinsic Safety
0 – Non IS
9 – IS (P1680 only)

0 – Welded adaptor
2 – Screw in adaptor

- 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 (taper)
- 6 10 x 1 mm Arsero Ermeto female
- 9 1/4 in 18 NPT female

Unit
B: mbar
P: psi

Pressure Reference
UD: uni-directional
BD: bi-directional

Pressure Range
(Enter full scale pressure range without units)
Low (psi) 0-1.5; 3.0; 5.0
(mbar) 0-100; 200; 350