

Model G2 Pressure Transducer



APPLICATIONS

The G2 pressure transducer combines performance with value to meet the demanding needs of the original equipment manufacturer in applications found in:

- Off-road Equipment
- Construction Machinery
- Performance Racing
- Railroad/Transportation
- Compressor Control
- HVAC and Refrigeration
- Agricultural Implements
- Process Automation and Control
- Hydraulic & Pneumatic Sensing
- Pump Monitoring

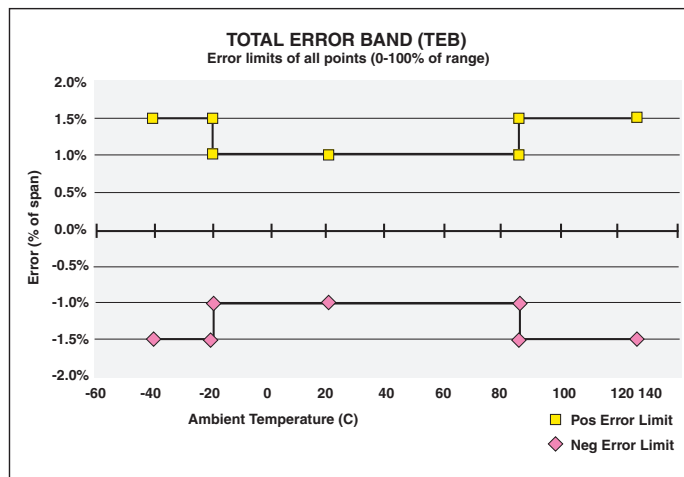
FEATURES

- 1% Total Error Band Accuracy
- Broad Temperature Capability
- All-welded pressure construction
- High EM/RFI rating
- Ranges 30 psi through 20,000 psi
- IP 67 Ingress rating
- Diagnostic rails

The Ashcroft® Type G2⁺ pressure transducer has been specifically designed with the high volume OEM in mind.

A ±1% Total Error Band accuracy is accomplished by marrying a high performance ASIC to a very stable, field proven polysilicon thin film pressure sensor. The sensor is electron beam welded to a pressure fitting of stainless steel, which provides excellent overpressure capability and outstanding durability in the presence of shock and vibration.

The circuitry is held within an internal cage and housed in an enclosure of reinforced Nylon.



PERFORMANCE SPECIFICATIONS

Ref. Condition 21°C ±1°C (72°F ±2°F)

Accuracy:

Total Error Band includes combined effects of temperature, non-linearity (Terminal Point Method), hysteresis, non repeatability, zero offset and span setting errors

±1% of Span: From -20 to 85°C (-4 to 185°F)

±1.5% of Span: From -40 to -20°C (-40 to -4°F)

±1.5% of Span: From 85 to 125°C (185 to 257°F)

Note: Static accuracy ±0.25% of span BFSL (Best Fit Straight Line Method); includes non-linearity, hysteresis and non-repeatable effects at reference temperature 72°F (21°C)

Stability: Less than ±0.25% span/year

Durability: Tested to 50 million cycles

ENVIRONMENTAL SPECIFICATIONS

Temperature:

Compensated -40 to 125°C (-40 to 257°F)

Operating -40 to 125°C (-40 to 257°F)

Storage -40 to 125°C (-40 to 257°F)

Humidity: 0 to 100% R.H., no effect

FUNCTIONAL SPECIFICATIONS

Select from over 25 pressure ranges starting at 30 psi and running through 20,000 psi gauge.

Compound (vacuum & pressure) ranges are also available, see "To Order" on back.

Overpressure (F.S.): Proof Burst

750 psi & below 200% F.S. 1000% F.S.

1500 psi 200% F.S. 500% F.S.

3000 psi 200% F.S. 500% F.S.

5000 psi 150% F.S. 500% F.S.

7500 psi 120% F.S. 500% F.S.

10,000 psi 120% F.S. 240% F.S.

20,000 psi 120% F.S. 240% F.S.

Vibration: Random vibration (20 g) over temperature range (-40° to 125°C). Exceeds typical MIL-STD. requirements

Shock: 100gs, 6 ms

Drop Test: Withstands 1 meter on concrete 3 axis

Response Time: Less than 1 msec

Warm-up Time: Less than 500 msec typical

Position Effect: Less than ±0.01% span, typical

ELECTRICAL SPECIFICATIONS

Output Signals Available:

Voltage Output	Excitation	Supply Current
0-5 Vdc, 3 wire	9-36 Vdc	5mA
0-10 Vdc, 3 wire	14-36 Vdc	5mA
1-5 Vdc, 3 wire	9-36 Vdc	4mA
1-6 Vdc, 3 wire	9-36 Vdc	4mA
0.5-4.5Vdc, 3 wire	9-36Vdc	4mA

Ratiometric Output:

0.5-4.5 Vdc, 3 wire 5 Vdc ±0.5 Vdc 3.5mA

Current Output:

4-20mA, 2 wire 9-36 Vdc

Reverse Polarity & Miswired Protected: Yes

Insulation Breakdown Voltage: 100 Vac

Insulation Resistance: Greater than 100 megohms at 100 Vdc

CE Marked: Per DoC

EMC Directive 2004/108/EC

IEC/EN 61326-1: Edition 1.0 Industrial

IEC/EN 61326-2-3: Edition 1.0 Annex BB Industrial

PED Directive

Ashcroft Inc., 250 East Main Street, Stratford, CT 06614 USA
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email: info@ashcroft.com • www.ashcroft.com

Model G2 Pressure Transducer

UL Recognized component per UL-61010-1, CSA 22.2 6101-1 Electrical Equipment for Measurement, Control and Laboratory use.

PHYSICAL SPECIFICATIONS

Wetted Materials: 304SS pressure connection and 17-4PH SS sensor diaphragm

Housing: 20% Glass Reinforced Nylon, Fire retardant to UL94 V1

Available Process Connections (Male):

See "How To Order" section below. For other connections consult factory.

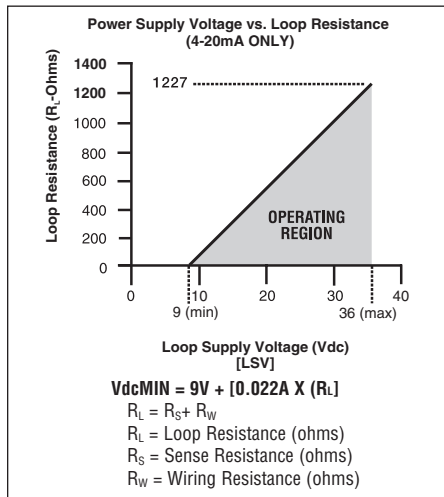
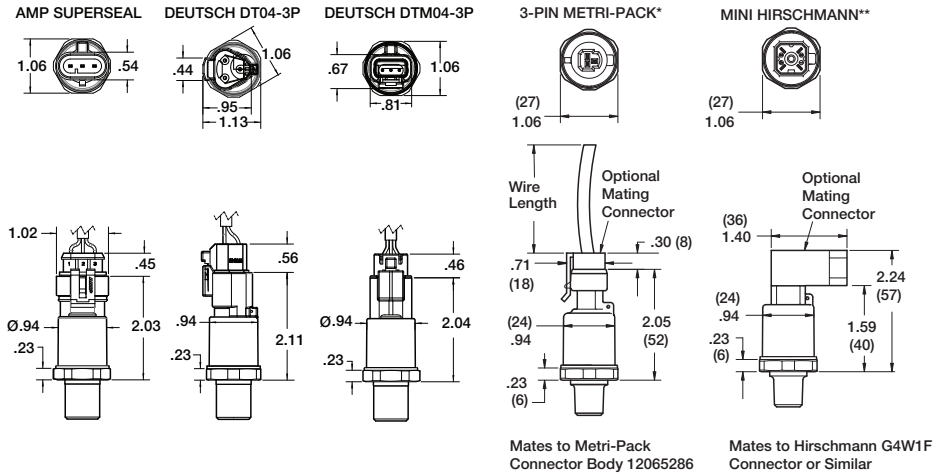
Ingress Rating:

- IP67, NEMA 4X:
 - Metri-Pack I50 series*
 - Shielded cable
 - Flying leads
 - Deutsch DT Series DT04-3P
 - Deutsch DTM Series DTM04-3P
 - AMP Superseal
 - M12 - Mates to Hirschmann 933 172-100 or similar
- IP65, NEMA 4X:
 - Hirschmann G series**
 - EN 175301-803, Form C (DIN 43650, Form C)

ELECTRICAL TERMINATION

See "How To Order" section below for electrical termination options.

DIMENSIONS



G2 7M02 42 010

How To Order

G 2	7								X	
Type Configuration (G2)	Accuracy	Output Signal	Electrical Termination	Pressure Ranges	Measurement Type	Optional X-Variations				
	1.0% Total Error Band -20°C/+85°C 1.5% Total Error Band -40°C/-20°C, 85/125°C	05 = 0-5 Vdc 10 = 0-10 Vdc 15 = 1-5 Vdc 16 = 1-6 Vdc 42 = 4-20mA 45 = 0.5-4.5Vdc 9-36Vdc supply RM = 0.5-4.5 Vdc Ratio Metric to 5Vdc supply	Metri-Pack* GN = no mating conn. G2 = mating conn. 3' cable G3 = mating conn. 10' cable G1 = mating conn. w/customer specified length Hirschmann G Series** HM = no mating conn. M1 = with mating conn. no cable M2 = mating conn. 3' cable P9 = mating conn. w/customer specified length Flying Leads W2 = 3' flying leads W9 = customer specified length Shielded Cable F2 = 3' shielded cable F3 = 10' shielded cable P1 = customer specified length M12 = Mates to Hirschmann 933 172-100 or similar EW = w/o mating conn. E0 = w/mating conn. no cable E2 = w/mating conn. & 3' shielded cable E1 = w/mating conn. & customer defined length	DT = w/out mating conn. T2 = w/1m, 3' cable T3 = w/3m, 10' cable T1 = w/mating conn. cable customer defined length Deutsch DT Series DT04-3P DS = w/out mating conn. S2 = w/1m, 3' cable S3 = w/3m, 10' cable S1 = w/mating conn. cable customer defined length AMP Superseal AP = w/out mating conn. A2 = w/1m, 3' cable A3 = w/3m, 10' cable A1 = w/mating conn. cable customer defined length EN 175301-803, Form C (DIN 43650, Form C) DC = no mating conn. N1 = with mating conn. no cable N2 = mating conn. 3' cable N3 = mating conn. 10' cable N9 = mating conn. w/customer specified length	30# = 30 psi 50# = 50 psi 60# = 60 psi 100# = 100 psi 150# = 150 psi 200# = 200 psi 300# = 300 psi 400# = 400 psi 500# = 500 psi 750# = 750 psi 1000# = 1000 psi 1500# = 1500 psi 2000# = 2000 psi 3000# = 3000 psi 4000# = 4000 psi 5000# = 5000 psi 6000# = 6000 psi 7500# = 7500 psi 10000# = 10000 psi 15000# = 15000 psi 20000# = 20000 psi	G = Gauge Pressure	30#&vac = 30 psi/-14.7 psi 45#&vac = 45 psi/-14.7 psi 60#&vac = 60 psi/-14.7 psi 85#&vac = 85 psi/-14.7 psi 100#&vac = 100 psi/-14.7 psi 150#&vac = 150 psi/-14.7 psi 200#&vac = 200 psi/-14.7 psi 300#&vac = 300 psi/-14.7 psi	Consult Factory for Available Options		
Consult factory for other connections † Not UL recognized above 10,000 psi range.										
*Metri-Pack is a trademark of Delphi Packard Electric Systems. **Trademark of Richard Hirschmann of America, Inc.										

⚠️ WARNING! READ ⚠️ BEFORE INSTALLATION

1. GENERAL:

A failure resulting in **injury** or **damage** may be caused by excessive overpressure, excessive vibration or pressure pulsation, excessive instrument temperature, corrosion of the pressure containing parts, or other misuse. Consult Ashcroft Inc., Stratford, Connecticut, USA before installing if there are any questions or concerns.

2. OVERPRESSURE:

Pressure spikes in excess of the rated overpressure capability of the transducer may cause **irreversible electrical and/or mechanical damage** to the pressure measuring and containing elements.

Fluid hammer and surges can destroy any pressure transducer and must always be avoided. A pressure snubber should be installed to eliminate the damaging hammer effects. Fluid hammer occurs when a liquid flow is suddenly stopped, as with quick closing solenoid valves. Surges occur when flow is suddenly begun, as when a pump is turned on at full power or a valve is quickly opened.

Liquid surges are particularly damaging to pressure transducers if the pipe is originally empty. To avoid damaging surges, fluid lines should remain full (if possible), pumps should be brought up to power slowly, and valves opened slowly. To avoid damage from both fluid hammer and surges, a surge chamber should be installed.

Symptoms of fluid hammer and surge's damaging effects:

- Pressure transducer exhibits an output at zero pressure (large zero offset).
- Pressure transducer output remains constant regardless of pressure
- In severe cases, there will be no output.

FREEZING:

Prohibit freezing of media in pressure port. Unit should be drained (mount in vertical position with electrical termination upward) to prevent possible overpressure damage from frozen media.

3. STATIC ELECTRICAL CHARGES:

Any electrical device may be susceptible to damage when exposed to static electrical charges. To avoid damage to the transducer observe the following:

- Ground the body of the transducer **BEFORE** making any electrical connections.
- When disconnecting, remove the ground **LAST!**

Note: The shield and drain wire in the cable (if supplied) is not connected to the transducer body, and is not a suitable ground.

4. USE IN LIFE SUPPORT DEVICES

Ashcroft Inc. products are not authorized for use as critical components in life support devices or systems without the express written approval of the General Manager, Stratford Operations of Ashcroft Inc. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

DESCRIPTION

The Ashcroft Model G1 pressure transducer is a high performance instrument intended for use in industrial applications where the process media is compatible with the 17-4PH stainless steel sensor material and the 304 SS process connection.

MECHANICAL INSTALLATION

Environmental

The G1 transducer can be stored and used within the temperature limits of -40°C to 125°C (-40°F to 257°F). Ingress protection ratings of the units are dependent on the electrical termination specified. Refer to the wiring diagrams on the reverse for the IP rating of the unit which is being installed.

Mounting

The G1 transducer requires no special mounting hardware and can be mounted in any orientation with negligible position error. Although the units can withstand considerable vibration without damage or significant output effects, it is always good practice to mount the transducer where there is minimum vibration. For units with NPT type pressure fittings apply sealing tape or an equivalent sealant to the threads before installing. When installing or removing the unit apply a wrench to the hex wrench flats, located above the pressure fitting. **DO NOT** tighten by using a pipe wrench on the housing. A 27mm ($1\frac{1}{8}$ ") wrench can be used on the wrench flats of the hex. For G1 models with detachable electrical connectors a 6 point deep socket can also be used to install the unit.

Electro-Magnetic Interference

The circuitry of the G1 transducer is designed to minimize the effect of electromagnetic and radio frequency interference. To minimize susceptibility to noise, avoid running the termination wiring in a conduit which contains high current AC power cables. Where possible avoid running the termination wiring near inductive equipment.

Field Adjustments

The G1 transducer is precisely calibrated and temperature compensated at the factory to ensure long and stable performance. There are no field accessible adjustments on the G1 transducer.

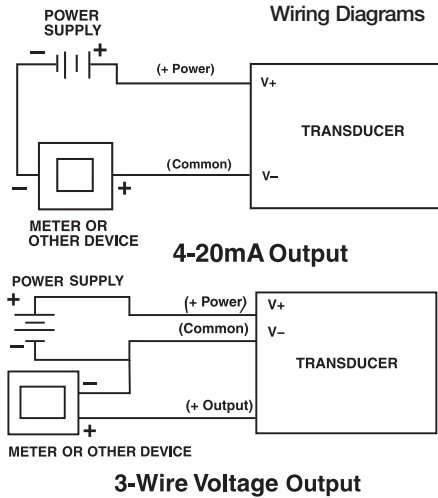
ELECTRICAL INSTALLATION

Please refer to the reverse of this page for power supply requirements and for appropriate wiring protocol based on the particular output signal and electrical termination features of the unit being installed.

G1 PRESSURE TRANSMITTER INSTRUCTION SHEET



G1 ELECTRICAL INSTALLATION

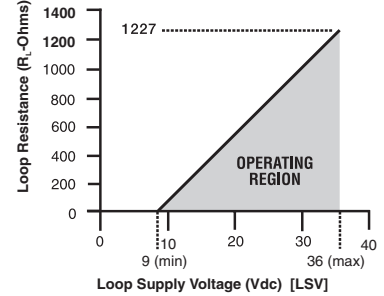


Power Supply Requirements:

Output Signal	Min Supply	Max Supply
1-5Vdc	9Vdc	36Vdc
4-20mA*	9Vdc	36Vdc

*For transmitters with 4-20mA output signal, the minimum voltage at the terminals is 9Vdc. However, the minimum supply voltage should be calculated using the adjacent graph and formula.

Power Supply Voltage vs Loop Resistance (4-20mA ONLY)



To determine minimum loop supply voltage:

$$LSV(\min) = 9(V) + [0.022(A) \cdot R_L]$$

Where:

LSV = Loop Supply Voltage (Vdc)

$R_L = R_S + R_W$ (ohms)

R_L = Loop Resistance (ohms)

R_S = Sense Resistance (ohms) [Measuring Instrument]

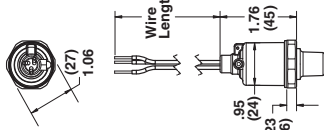
R_W = Wiring Resistance (ohms)

G1 ELECTRICAL TERMINATIONS AND WIRING

SHIELDED CABLE, PVC JACKET, 24AWG LEADS

Wire Color	Voltage Output	4-20mA Output*
Red	V +	V +
Black	Common	
White	Output	V -
Bare**	Shield Drain Wire	Shield Drain Wire

IP67 Ingress rating

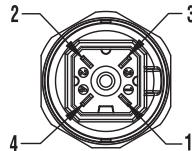


MINI DIN HIRSCHMANN G SERIES

Mates to Hirschmann G4W1F connector, or equal

Pin No.	Voltage Output	4-20mA Output*	Mating Cable Color
1	V +	V +	Red
2	Common	V -	Black
3	Output	V -	White
4	Case Gnd.	Case Gnd.	Green

IP67 Ingress rating

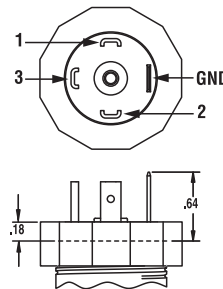


DIN 43650-A & CONDUIT ADAPTER (½ NPTF) (DO), (CD)

Mates to Hirschmann connector GDM 3009 or equal

Pin No.	Voltage Output	4-20mA Output*	Mating Cable Color
1	V +	V +	Red
2	Common	Common	Black
3	Output	None	White
GND	Case Gnd.	Case Gnd.	Green

IP65 Ingress rating

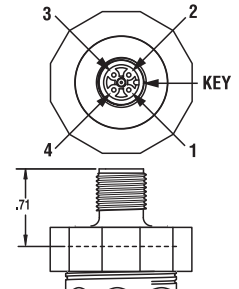


M12 ELECTRICAL TERMINATION (EW)

Mates to optional Hirschmann connector Part 933 172-100 or equal

Pin No.	Voltage Output	4-20mA Output*	Mating Cable Color
1	V +	V +	Red
2	Output	None	White
3	Case Gnd.	Case Gnd.	Green
4	Common	Common	Black

IP65 Ingress rating



* Use either V- termination on G1 with 4-20mA output

** Where shielded wiring is being used; Connect the drain wire to the guard terminal on the read out device or measuring instrument if available. In all other cases connect to the ground of the power supply negative terminal.



Multi-Sense® Model 231

Multi-Configurable, Wet-to-Wet Differential Pressure Transducer

Setra's 231 is a multi-configurable, wet-to-wet differential pressure transducer offering the user an all-in-one device with field selectable pressure ranges and analog outputs. The device is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance. The 231 has a robust, NEMA 4 enclosure with an LCD display and a hinged, captive cover allowing for easy access to switches for adjusting the range and output.

Field Selectable Pressure Ranges

The 231 offers 8 field selectable pressure ranges which can be changed using a slide switch, eliminating the risk of ordering the wrong range or improperly installing the unit. The multi-range functionality allows the user to hold less inventory and add additional flexibility in the field.

Quick & Simple Installation

The 231 provides the user with an optional 3 or 5 valve machined brass manifold which can save money on installation and maintenance. The single piece construction of the brass body has no internal process connections, eliminating the risk of internal leaks.

Robust Enclosure for Difficult Applications

The 231 NEMA 4 housing offers an optional LCD display for instant indication of the high, low and differential pressure readings. A hinged enclosure makes it suitable for harsh environments and saves the hassle of misplacing it when completing a difficult installation.



- Dual Sensors
- Suitable for Harsh Environments
- 3 & 5 Valve Manifold Assembly Options

Model 231 Features:

- 4 Field Selectable Outputs
- 8 Field Selectable Pressure Ranges
- Field Accessible Push-Button Zero & Remote Zero
- Hinged Cover
- Optional LCD Display
- All Cast Aluminum, NEMA 4 Rated Housing
- CE & RoHS Compliant

Applications:

- Energy Management Systems
- Process Control Systems
- Flow Measurement of Various Gases or Liquids
- Liquid Level Measurement of Pressurized Vessels
- Pressure Drop Across Filters

Multi-Sense® Model 231

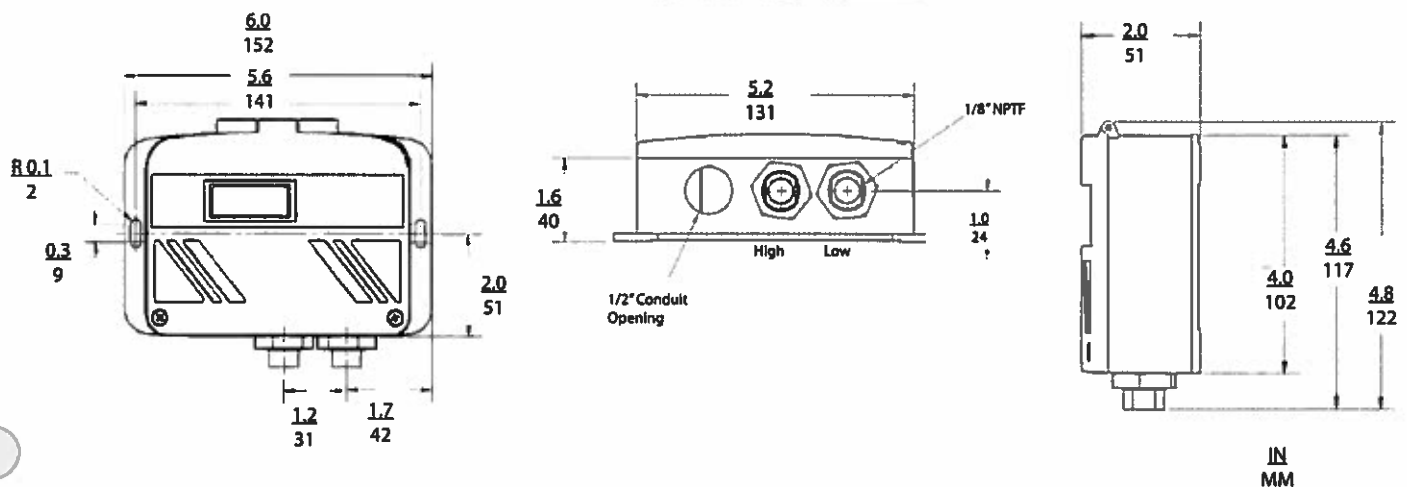
Multi-Configurable, Wet-to-Wet Differential Pressure Transducer



GENERAL SPECIFICATIONS

Electrical Data (Voltage)		Performance Data	
Circuit	3-Wire	Accuracy RSS ¹ (at constant temp.)	
Excitation	15 to 30 VDC/18 to 30 VAC (Reverse Excitation Protected)	Pressure Ranges A, B, C	±1.0% FS
Output ¹	0 to 5 VDC, 0 to 10 VDC, 1 to 5 VDC	Pressure Ranges D	±2.0% FS
Output Impedance	30 Ohms	Pressure Ranges	
Circuit Consumption	8 mA (typ.) at 5 VDC, 8 mA (typ.) at 10 VDC, 40 mA (typ.) at 18-30 VAC	Range Code	A B C D Max. Line Pressure
		MS1	50 25 10 5 50
		MS2	100 50 20 10 100
Circuit	2-wire (Reverse Excitation Protected)	MS3	250 125 50 25 250
Output ²	4 to 20 mA	Pressure Media	
External Load	0 to 250 Ohms	Liquids or Gases Compatible with 17-4 PH Stainless Steel Note: Hydrogen not recommended for use with 17-4 PH stainless steel	
Min. Supply Voltage (VDC)	15 + 0.02 x (Resistance of receiver plus line)	Thermal Effects³	
Max. Supply Voltage (VDC)	30 + 0.004 x (Resistance of receiver plus line)	Compensated Range °F (°C)	+32 to +130 (0 to +54)
Physical Description		Zero/Span Shift %FS/100°F (50°C)	2.0 (1.8)
Case	Die Cast Aluminum, Powder Coated	Warm-up Shift	<0.12% FS
Pressure Fittings	1/8-18 NPT Internal	Response Time	1 to 5 sec. (selectable)
Electrical Connection	1/2 in. Conduit	Proof Pressure	2 x Full Scale
Size	4.0 x 6 x 2 in. (102 x 152 x 51 mm)	Burst Pressure	15 x Full Scale (50 PSI), 10 x Full Scale (75 x 150 PSI), 8 x Full Scale (250 PSI)
Weight	1.5 lb	¹ Calibrated into a 50k ohm load, operable into a 5000 ohm load or greater.	
Sensor Vacuity Volume	0.2 cc	² Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.	
Environmental Data		³ Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher or lower.	
Operating ¹ Temperature °F (°C)	-4 to +185 (-20 to +85)	* RSS of Non-Linearity, Hysteresis, and Non-Repeatability.	
Storage Temperature °F (°C)	-4 to +185 (-20 to +85)	⁴ Units calibrated at nominal 70°F. Maximum thermal error computed from this datum. Specifications subject to change without notice.	
Vibration	10g from 50Hz to 2000 Hz		
Shock	200g		

MODEL 231 DIMENSIONS



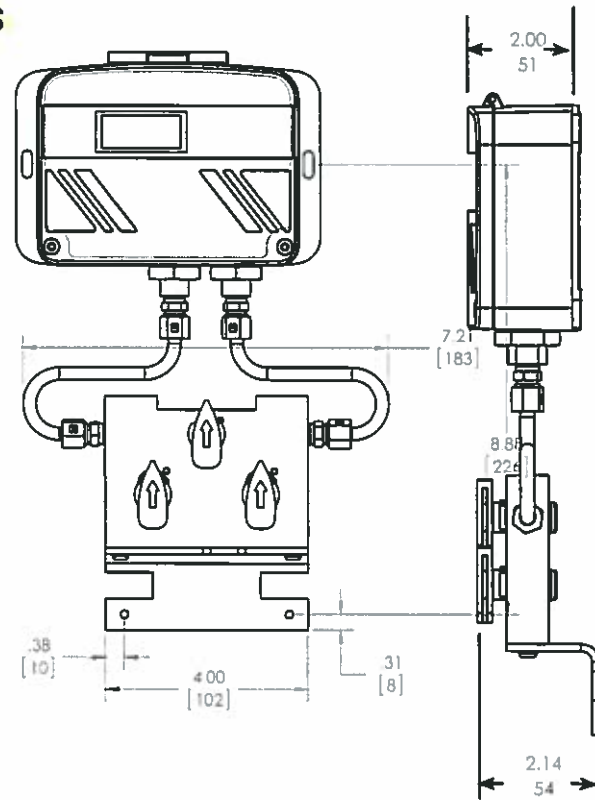
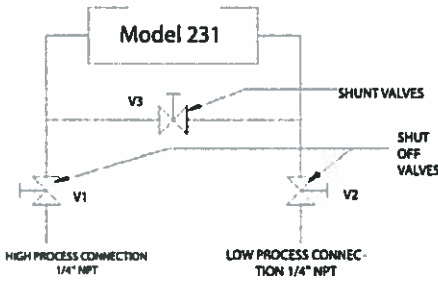
Multi-Sense® Model 231

Multi-Configurable, Wet-to-Wet Differential Pressure Transducer



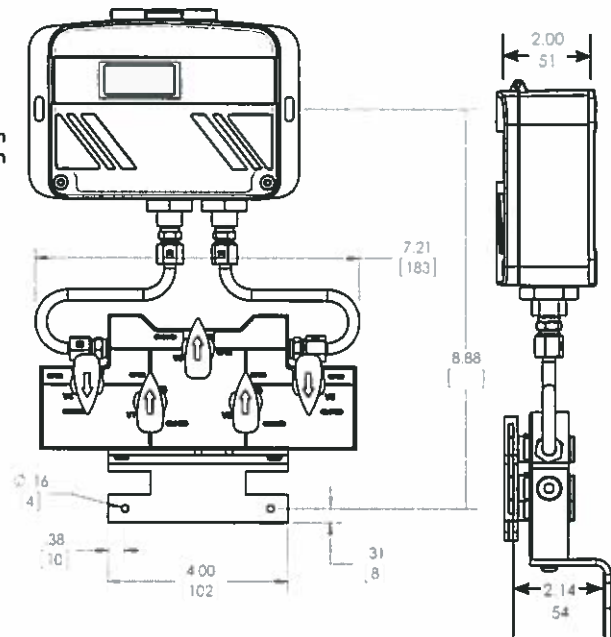
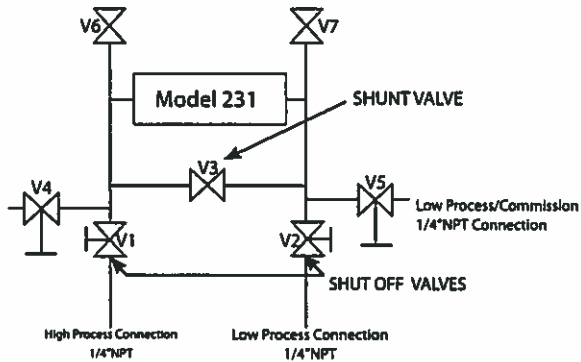
3-VALVE MANIFOLD ASSEMBLY DIMENSIONS

Manifold Block Brass
 Valves (3) V1 for connection to +port
 V2 for connection to -port
 V3 for equalizing pressure
 Valve type 90 Degree On/Off
 Process Connections 1/4"-18 NPT Internal Thread



5-VALVE MANIFOLD ASSEMBLY DIMENSIONS

Manifold Block Brass
 Valves (5) V1 for connection to ±port
 V2 for connection to -port
 V3 for equalizing pressure
 V4 for connection to external gauge or alternate plumbing configuration
 V5 for connection to external gauge or alternate plumbing configuration
 Valve Type 90 Degree On/Off
 Process Connection 1/4" -18 NPT Internal Thread



Multi-Sense® Model 231



Multi-Configurable, Wet-to-Wet Differential Pressure Transducer

231G-M31-3V-D

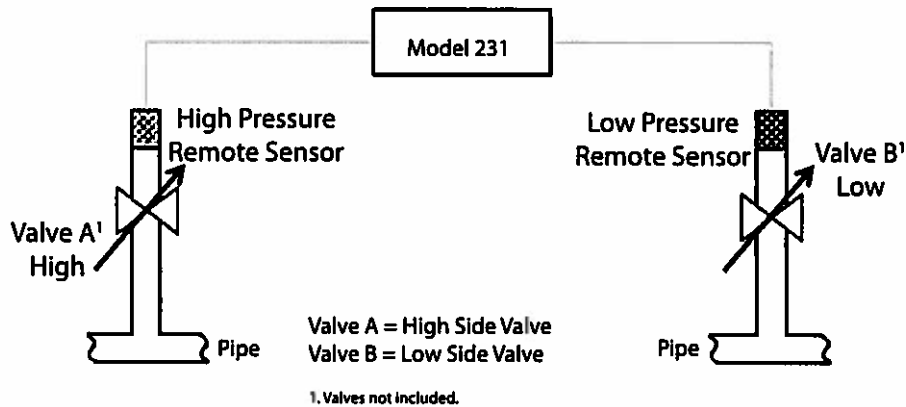
ORDERING INFORMATION

2	3	1	G	-	[] [] []	-	[] []	-	[]
Model	Range Specifications ¹		Pressure Connection		Display				
231G = 231	Unidirectional	Bidirectional	2F	1/8-18 NPT female (Standard) Sensor (Conduit Version)	N	No Display			
MS1	5, 10, 25, 50 PSID	±5, ±10, ±25, ±50 PSID	3V	3-V Manifold assembled w/ Model 231	D	LCD Display			
MS2	10, 20, 50, 100 PSID	±10, ±20, ±50, ±100 PSID	5V	5-V Manifold assembled w/ Model 231					
MS3	25, 50, 125, 250 PSID	±25, ±50, ±125, ±250 PSID							

¹ Maximum line pressure is maximum range of pressure ordered.

Ordering Example: 231GMS12FD = Model 231, 5 PSID up to 50 PSID, 1/8" NPT Female Fitting, and LCD Display 31GMS13VN = Model 231, 0 to 5 PSID up to 50 PSI, 3-Valve Manifold, and No LCD Display

INSTALLATION



PRESSURE RANGE CODE SELECTOR (IMPORTANT: READ BEFORE ORDERING)

Examine the pressure application and determine what is the Highest System Line Pressure.
 Determine what is the Differential Pressure being measured.
 Find the MAX. Line Pressure in the table on the right that is \geq to your Highest System Line Pressure.
 Verify that your DP falls within the selectable ranges in that row.
 Follow that row to the left and select that range code.

Range Code	A	B	C	D	Max. Line Pressure
MS1	50	25	10	5	50
MS2	100	50	20	10	100
MS3	250	125	50	25	250

Example:
 Highest System Line Pressure: 125 PSIG
 Differential Pressure Measured: 50 PSID
 Max Line Pressure \geq to System Line Pressure: 250 PSID (50 PSID DP falls within ranges in this row)
 Select Range Code: MS3