

MVX 3000 Multivariable Pressure Transducer

34-SM-04-01
10/2002

Ranges:

Differential Pressure	0 to 400 inH ₂ O	0 to 1000 mbar
Absolute Pressure	0 to 750 psia	0 to 52 bara
Or	0 to 1500 psia	0 to 104 bara
Gauge Pressure	0 to 3000 psig	0 to 208 barg

Specification and Model Selection Guide

Introduction

The **MVX 3000 Multivariable Pressure Transducer**, based on Honeywell ST 3000 and SMV 3000 sensor technology, measures both differential pressure and static pressure (absolute or gauge) and can replace two separate transmitters or transducers integrated to flow computers today.

The MVX 3000 increases flow calculation accuracy and improves flow computer reliability. Multiple measurements, combined with proven sensor characterization, will lower your overall costs when integrating the MVX 3000 to a flow computer.

The MVX 3000 Multivariable Pressure Transducer transmits an output signal proportional to the measured variables in multiplexed pulse format for interfacing with the flow computers or RTUs.

Flow Computer Benefits

Highly accurate piezoresistive sensor technology provides better than 0.075% accuracy for differential pressure and static pressure, which relates directly to increased flow accuracy for flow computer manufacturers.

Single Sensor Capsule provides both DP and AP or GP measurements and therefore lowers the total cost of integration to flow computers.

Highly Stable Sensor provides +/-0.0625% of URL (0.25" H₂O) per year stability for DP, +/-0.008% of URL (0.24 psi) per year stability for GP and +/-0.016% of URL (0.12 psi) per year stability for AP. Stable sensors improve product reliability and reduce zero drift for flow computers

Proven Sensor Technology

The MVX 3000 utilizes proven Honeywell Piezoresistive sensor technology and has an ion-implanted silicon chip hermetically sealed in its meter body. This single piezoresistive capsule actually contains three sensors in one; a differential pressure sensor, a static pressure sensor, and a meter body temperature sensor. Process pressure applied to the transmitter's diaphragm transfers through the fill fluid to the sensor. Voltage bridge (Wheatstone) circuits on the chip measure the differential and static pressures while a resistor in a voltage divider measures the temperature. These three input signals from the sensor, coupled with the characterization data stored in the flow computer EPROM, are then used by the microprocessor to calculate highly accurate values for the differential pressure and static pressure measurements.

MVX 3000 Integration

To utilize the MVX 3000 Multivariable Pressure Transducer, the flow computer company must develop a circuit board to communicate with the MVX 3000. This circuit board should include a 10-pin connector and also provide all operating power to the MVX 3000. With 5 Vdc power, the MVX 3000 provides a pulse train of signals proportional to differential pressure, static pressure and meter body temperature. The flow computer circuit board must be designed to count the pulse duty cycle to interpret the signals.

Summary

The MVX 3000 family of multivariable pressure transducers utilizes a single sensor capsule to measure both differential pressure and static pressure and provides the most accurate, cost-effective meter body in the industry for integration to flow computers.

Specifications

Operating Conditions

Parameter	Reference Condition	Rated Condition	Operative Limits	Transportation and Storage
Meter Body Temperature °C °F	25 ±1 77 ±2	–40 to 110* –40 to 230*	–40 to 125* –40 to 257*	–55 to 125 –67 to 257
Overpressure psi bar	0 0	3000 210	3000 210	
Vacuum Region - Minimum Pressure mmHg absolute inH ₂ O absolute	Atmospheric Atmospheric	25 13		

*For CTFE fill fluid, the rating is –15 to 110°C (5 to 230°F).

Physical

Parameter	Description
Process Interface Material	Process Barrier Diaphragms: 316L SS, Hastelloy C-276 Process Head: 316 SS, Carbon Steel Head Gaskets: Glass Reinforced Teflon Bolting: Carbon Steel, A286 SS (NACE) optional
Fill Fluid	Silicone oil or CTFE (Chlorotrifluoroethylene)
Process Connections	1/4-inch NPT

Specifications, continued

Performance Under Rated Conditions - Differential Pressure Measurement

Parameter	Description		
Model ⇒	MXA125	MXA145	MXG170
Upper Range Limit	+/-400 inH ₂ O (1000 mbar) at 39.2 °F (4 °C) standard reference temperature.	+400 inH ₂ O (1000 mbar) at 39.2 °F (4 °C) standard reference temperature.	+400 inH ₂ O (1000 mbar) at 39.2 °F (4 °C) standard reference temperature.
Reference Pressure			
Accuracy :	25 inH ₂ O (187.5 mbar)	75 inH ₂ O (187.5 mbar)	50 inH ₂ O (187.5 mbar)
Temperature & Pressure :	50 inH ₂ O (187.5 mbar)	100 inH ₂ O (187.5 mbar)	100 inH ₂ O (187.5 mbar)
Turndown Ratio	+/-400 to 1	400 to 1	400 to 1
Minimum Span	+/-1 inH ₂ O (2.5 mbar)	+1 inH ₂ O (2.5 mbar)	+1 inH ₂ O (2.5 mbar)
Reference Accuracy <i>(Includes combined effects of linearity, hysteresis, and repeatability)</i> • Accuracy includes residual error after averaging successive readings.	±0.075% of calibrated span or upper range value (URV), whichever is greater. For URV below reference point (25 inH ₂ O), accuracy equals: 0.0125% +/- 0.0625% (25/span)	±0.075% of calibrated span or upper range value (URV), whichever is greater. For URV below reference point (75 inH ₂ O), accuracy equals: 0.0125% +/- 0.0625% (75/span)	Better than +/-0.075% of calibrated span or upper range value (URV), whichever is greater. For URV below reference point (50 inH ₂ O), accuracy equals: 0.0125% +/- 0.0625% (50/span)
Zero Temperature Effect per 28°C (50°F)	±0.1% of calibrated span.	±0.1% of calibrated span.	±0.125% of calibrated span.
Combined Zero + Span Temperature Effect per 28°C (50°F)	±0.125% of calibrated span.	±0.125% of calibrated span.	±0.2% of calibrated span.
Zero Static Pressure Effect per 1000 psi (70 bar)	±0.24% of calibrated span.	±0.12% of calibrated span.	±0.125% of calibrated span.
Combined Zero + Span Static Pressure Effect per 1000 psi (70 bar)	±0.8% of calibrated span.	±0.4% of calibrated span.	±0.2% of calibrated span.
Drift*	±0.0625% of URL per year (+/-0.25 inH ₂ O per year)	±0.0625% URL per year (+/-0.25 inH ₂ O per year)	±0.0625% of URL per year (+/-0.25 inH ₂ O per year)

*All Drift specifications are based on the Honeywell Smart Multivariable Transmitters.

Specifications, continued

Performance Under Rated Conditions - Absolute Pressure Measurement (MXA125)

Parameter	Description
Upper Range Limit (URL)	750 psia (52 bara)
Reference Pressure	Accuracy : 20 psia (1.4 bara)
	Temperature Effect : 50 psia (3.5 bara)
Turndown Ratio	150 to 1
Minimum Span	5 psia (0.35 bara)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Reference Accuracy <i>(Includes combined effects of linearity, hysteresis, and repeatability)</i>	±0.075% of calibrated span or upper range value (URV), whichever is greater - Terminal based. Below Reference Point: 0.0125% +/- 0.0625% (20/span)
Zero Temperature Effect per 28°C (50°F)	±0.10 % of calibrated span.
Combined Zero + Span Temperature Effect per 28°C (50°F)	±0.125 % of calibrated span.
Drift *	+/-0.016% of URL per year (+/-0.12 psi per year)

Performance Under Rated Conditions - Absolute Pressure Measurement (MXA145)

Parameter	Description
Upper Range Limit (URL)	1500 psia (104 bara)
Reference Pressure	Accuracy : 250 psia (17.2 bara)
	Temperature Effect : 250 psia (17.2 bara)
Turndown Ratio	15 to 1
Minimum Span	100 psia (10.4 bara)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Reference Accuracy <i>(Includes combined effects of linearity, hysteresis, and repeatability)</i>	±0.075% of calibrated span or upper range value (URV), whichever is greater - Terminal based. Below Reference Point: 0.0125% +/- 0.0625% (250/span)
Zero Temperature Effect per 28°C (50°F)	±0.10 % of calibrated span.
Combined Zero + Span Temperature Effect per 28°C (50°F)	±0.125 % of calibrated span.
Drift *	+/-0.016% of URL per year (+/-0.24 psi per year)

Specifications, continued

Performance Under Rated Conditions - Gauge Pressure Measurement (MXG170)

Parameter	Description
Upper Range Limit (URL)	3000 psig (208 barg)
Reference Pressure Accuracy :	300 psig (20.8 barg)
Temperature Effect :	300 psig (20.8 barg)
Turndown Ratio	30 to 1
Minimum Span	100 psig (6.9 barg)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Reference Accuracy <i>(Includes combined effects of linearity, hysteresis, and repeatability)</i>	±0.075% of calibrated span or upper range value (URV), whichever is greater - Terminal based. Below Reference Point: 0.0125% +/- 0.0625% (300/span)
Zero Temperature Effect per 28°C (50°F)	±0.10% of calibrated span.
Combined Zero + Span Temperature Effect per 28°C (50°F)	±0.125% of calibrated span.
Drift *	+/-0.008% of URL per year (+/-0.24 psi per year)

Model Selection Guide (34-ST-16-50)

MVX 3000 Multivariable Pressure Transducer

MSG without Pricing

Differential Pressure - Static Pressure

Model Selection Guide
34-ST-16-50 Issue 3

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Instructions

Select the desired Key Number. The arrow to the right marks the selection available.
Make one selection from each table, I and II, using the column below the proper arrow.
Select as many Table III options as desired (if no options are desired, specify 00).
A dot denotes unrestricted availability. A letter denotes restricted availability.
Restrictions follow Table IV.

Key Number I II III (Optional) IV
 [] - [] - [] - [] + [XXXX]

KEY NUMBER		Selection	Availability			
Differential Pressure Range	Pressure Range					
0 to +/-400" H ₂ O (0 to +/-1000 mbar)	0-750 psia (52.5 bara)	MXA125	↓			
0 to +/-400" H ₂ O (0 to +/-1000 mbar)	0-1,500 psia (105 bara)	MXA145		↓		
0 to +400" H ₂ O (0 to +1000 mbar)	0-3,000 psia (210 bara)	MXA170				
0 to +400" H ₂ O (0 to +1000 mbar)	0-3,000 psig (210 barg)	MXG170				↓

TABLE I - METER BODY

	Process Heads	Vent/Drain Valves and Plugs	Barrier Diaphragms					
Materials of Construction	Carbon Steel *	316 St. St.	316 LSS	A __	•	•		•
	Carbon Steel *	316 St. St.	Hastelloy C	B __	•	•		•
	316 St. St.	316 St. St.	316 LSS	E __	•	•		•
	316 St. St.	316 St. St.	Hastelloy C	F __	•	•		•
	Hastelloy C	Hastelloy C	Hastelloy C	J __				
Fill Fluid	Silicone			_ 1 _	•	•		•
Process Head Configuration	1/4" NPT			__ A	•	•		•
	Rotated (Vertical) Process Heads with 1/4" NPT			__ R	f	f		f

* Carbon Steel heads are zinc-plated.

TABLE II

No Selection	00000				
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Model Selection Guide, cont.

TABLE III - OPTIONS	Availability				
	MXG170	MXA1 _	25	45	70 70
	Selection				
None	00	•	•		•
Viton Head Gaskets (1/2" adapter gaskets are special)	VT	z	z		z
Lightning Protection	LP				
A286SS (NACE) Bolts and 302/304SS (NACE) Nuts for Heads and 316SS (NACE) Bolts for Adapters	CR	•	•		•
Compound Characterized	CM				•
NACE Certificate (F0198)	F7	•	•		•
SS Center Vent Drain and Bushing	CV	f	f	f	f

TABLE IV

Factory Identification	XXXX				
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RESTRICTIONS

Restriction	Available Only With		Not Available With	
Letter	Table	Selection	Table	Selection
f			I	J _ _
z			I	B _ _ , F _ _ , J _ _

Ordering Information

Contact your nearest Honeywell sales office, or

In the U.S.:

Honeywell
Industrial Automation & Control
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Honeywell

Industrial Measurement and Control

Honeywell International Inc.
16404 North Black Canyon Highway
Phoenix, Arizona 85053

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