

# MVX 2000 Multivariable Pressure Transducer

## Specifications

34-SM-04-02 March 2010



### Introduction

The MVX 2000 Multivariable Pressure Transducer, based on Honeywell multivariable sensor technology, measures both differential pressure and absolute pressure and can replace two separate transmitters or transducers integrated to flow computers or chart recorders today. The MVX 2000 enhances flow calculation accuracy and improves flow computer reliability. Multiple measurements, combined with Proven Sensor Characterization, will lower your overall costs when integrating the MVX 2000 to a flow computer. The MVX 2000 Multivariable Pressure Transducer transmits an output signal proportional to the measured variables in multiplexed pulse format for interfacing with the Flow Computers or RTUs.

### Proven Sensor Technology

The MVX 2000 utilizes proven Honeywell piezoresistive sensor technology and has an ion-implanted silicon chip hermetically sealed in its meter body. This single piezo-resistive 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 measures 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 external EPROM are then used by the flow computer microprocessor to calculate accurate values for the differential pressure and static pressure measurements.



Figure 1 – MVX2000 Multivariable Pressure Transducer

### Flow Computer Benefits

Cost-effective piezoresistive sensor technology provides  $\pm 0.25\%$  accuracy for differential pressure and absolute pressure, which relates directly to increased flow accuracy for manufacturers of cost-effective flow computers.

Single Sensor Capsule integrated into a meter body design provides both differential pressure (DP) and absolute pressure (AP) measurements and lowers the total cost of integration to flow computers.

The MVX 2000 Sensor provides stable readings for DP and AP, which improve product reliability and reduces zero drift for flow computers.

## MXV 2000 Integration

In order to utilize the MXV 2000 Multivariable Pressure Transducer, the flow computer OEM must develop a circuit board to communicate with the MXV 2000. This circuit board should include a 10-pin connector to attach to the sensor and provide all operating power to the MXV 2000.

With +5 Vdc power, the MXV 2000 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 MXV 2000 multivariable pressure transducer utilizes a meter body with a single sensor capsule to measure both differential pressure and absolute pressure and therefore provides the most cost-effective integrated transducer-flow computer to replace aging chart recorders that are costly due to high maintenance and inaccuracy.

## Operating Conditions – MXV 2000

Parameter	Reference Condition		Rated Condition		Operative Limits		Transportation and Storage	
	°C	°F	°C	°F	°C	°F	°C	°F
<b>Ambient Temperature</b>	25±1	NA	-40 to 85	NA	-40 to 185	NA	-55 to 125	NA
<b>Meter Body Temperature</b>	25±1	77±2	-40 to 110	-40 to 230	-40 to 125	-40 to 257	-55 to 125	-67 to 257
<b>Vacuum Region, Minimum Pressure</b> <i>mmHg absolute</i> <i>inH<sub>2</sub>O absolute</i>	Atmospheric		25 13					
<b>Maximum Allowable Working Pressure (MAWP)</b> (ST 3000 products are rated to Maximum Allowable Working Pressure. MAWP depends on Approval Agency and transmitter materials of construction.)*	MXA045 = 3,000 psi, 210 bar** Static Pressure Limit = Maximum Allowable Working Pressure (MAWP) = Overpressure Limit							

\* Consult factory for MAWP of transmitters that require CSA approval (CRN)

\*\* The MAWP is intended as a pressure safety limit. Honeywell does not recommend use above the PV 2 Upper Range Limit.

## Physical Bodies

<b>Process Interface Material</b>	<b>Process Barrier Diaphragms:</b> 316 SS <sup>4</sup> <b>Process Head:</b> Carbon Steel (Zinc-plated) <sup>5</sup> , 316 SS <sup>4</sup> <b>Head Gaskets:</b> Glass Reinforced Teflon <sup>®1</sup> or Viton <sup>®</sup> is optional <b>Bolting:</b> Carbon Steel, 316 SS <sup>4</sup>
<b>Vent/Drain Valves &amp; Plugs</b> <sup>1</sup>	316 SS, Hastelloy <sup>®</sup> C-276 <sup>7</sup> , Monel 400 <sup>®8</sup>
<b>Fill Fluid</b>	Silicone DC <sup>®</sup> 200 oil
<b>Process Connections</b>	1/4-inch NPT

<sup>1</sup> Vent /Drains are sealed with Teflon<sup>®</sup> or PTFE

<sup>4</sup> Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.

<sup>5</sup> Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use 316 stainless steel wetted Process Heads.

<sup>7</sup> Hastelloy<sup>®</sup> C-276 or UNS N10276

<sup>8</sup> Monel 400<sup>®</sup> or UNS N04400

Viton<sup>®</sup> is a registered trademark of DuPont

Teflon<sup>®</sup> is a registered trademark of DuPont.

DC<sup>®</sup> 200 is a registered trademark of Dow Corning.

**Performance Under Rated Conditions - Differential Pressure Measurement**

Parameter	Description
<b>Upper Range Limit</b> inH <sub>2</sub> O mbar	400 at 39.2°F (4°C) is standard reference temperature for inH <sub>2</sub> O range.) 1,000
<b>Minimum Span</b> inH <sub>2</sub> O mbar	1 2.5
<b>Turndown Ratio</b>	400 to 1
<b>Reference Pressure Accuracy</b> inH <sub>2</sub> O mbar	50 125
<b>Temperature and Pressure</b> inH <sub>2</sub> O mbar	50 125
<b>Reference Accuracy</b> (Includes combined effects of linearity, hysteresis, and repeatability)	±0.25% of calibrated span or upper range value (URV), whichever is greater. For URV below reference point (50 inH <sub>2</sub> O), accuracy equals: ± 0.25% (50/span)
<b>Zero Temperature Effect per 28°C (50°F)</b>	±0.3% of calibrated span. For URV below reference point (50 inH <sub>2</sub> O), accuracy equals: ± 0.3% (50/span)
<b>Combined Zero and Span Temperature Effect per 28°C (50°F)</b>	±0.6% of calibrated span. For URV below reference point (50 inH <sub>2</sub> O), accuracy equals: ± 0.6% (50/span)
<b>Zero Static Pressure Effect per 1,000 psi (70 bar)</b>	±0.3% of calibrated span. For URV below reference point (50 inH <sub>2</sub> O), accuracy equals: ± 0.3% (50/span)
<b>Combined Zero and Span Static Pressure Effect per 1,000 psi (70 bar)</b>	±1.0% of calibrated span. For URV below reference point (50 inH <sub>2</sub> O), accuracy equals: ± 1.0% (50/span)

\* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316 Stainless Steel barrier diaphragm.

**Performance Under Rated Conditions - Absolute Pressure Measurement**

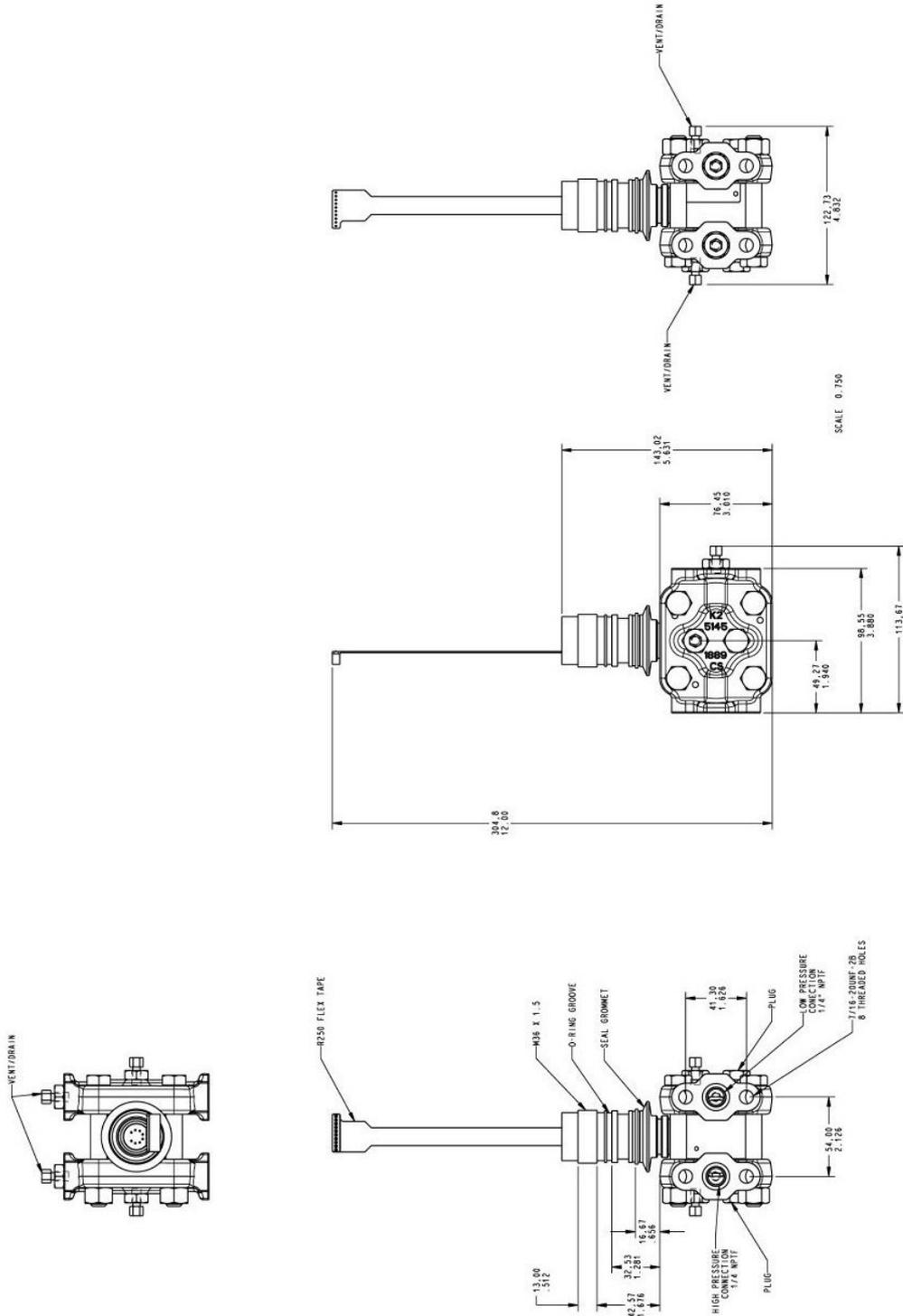
Parameter	Description
<b>Upper Range Limit</b> psia	1,500
<b>Minimum Span</b> mbar	100
<b>Turndown Ratio</b>	15 to 1
<b>Reference Pressure Accuracy</b> psia  <b>Temperature and Pressure</b> psia	250  250
<b>Zero Suppression</b>	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
<b>Reference Accuracy</b> (Includes combined effects of linearity, hysteresis, and repeatability)	±0.25% of calibrated span or upper range value (URV), whichever is greater - Terminal based. For URV below reference point (250 psig), accuracy equals: ±0.25% (250/span)
<b>Zero Temperature Effect per 28°C (50°F)</b>	±0.9% of calibrated span. For URV below reference point (250 psig), accuracy equals: ± 0.9% (250/span)
<b>Combined Zero and Span Temperature Effect per 28°C (50°F)</b>	±0.9% of calibrated span. For URV below reference point (250 psig), accuracy equals: ± 0.9% (250/span)
<b>Stability</b>	±0.01% of URL per year for lifetime

\* Performance specifications are based on reference conditions of 25°C (77°F), zero (0) static pressure, 10 to 55% RH, and 316 Stainless Steel barrier diaphragm.

**Mounting**

**MVX2000 & MVX3000 with standard process heads**

Reference Dimensions  $\frac{\text{millimeters}}{\text{inches}}$



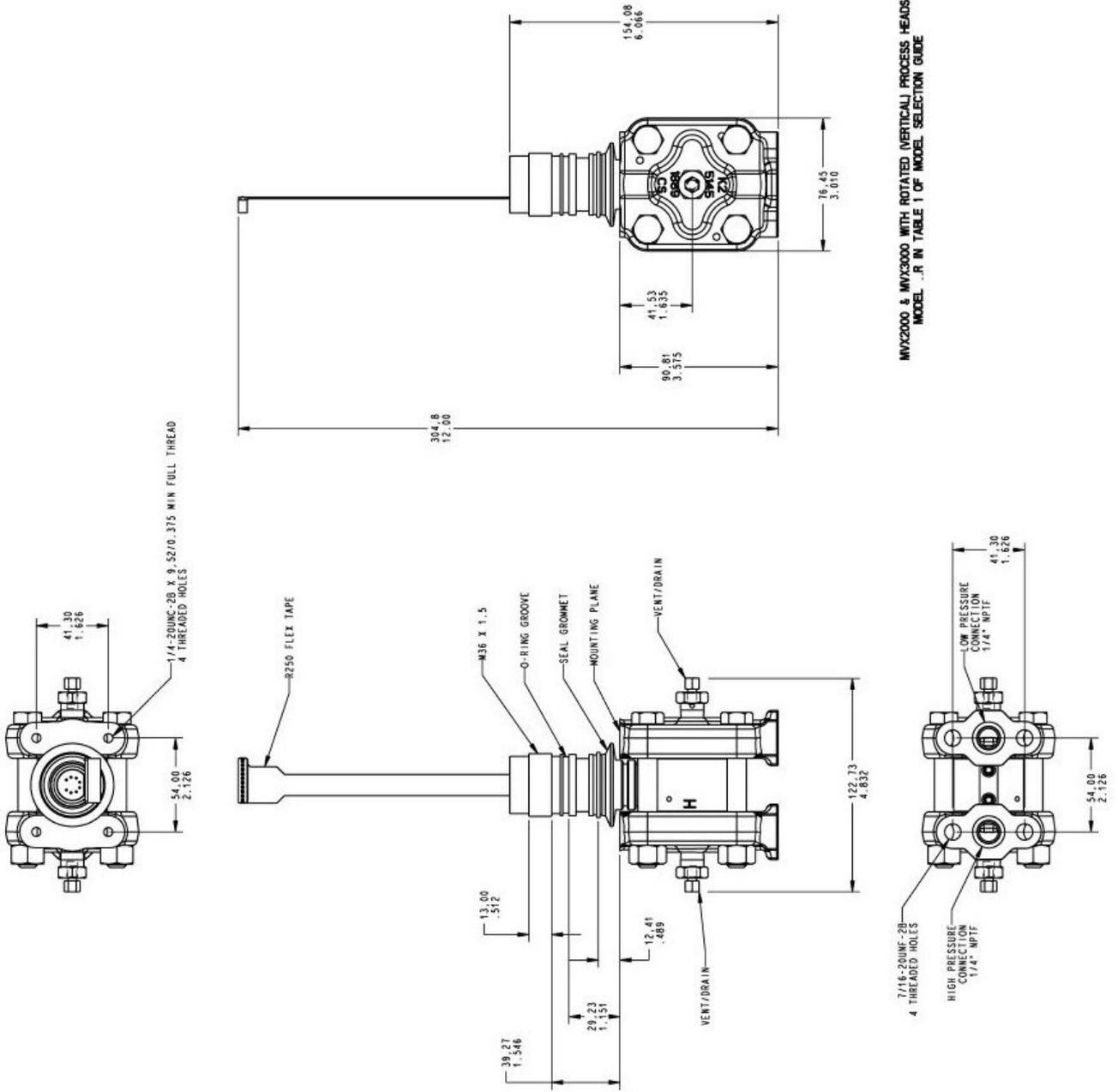
MVX2000 & MVX3000 WITH PROCESS HEADS  
IN STANDARD ORIENTATION MODEL ...A IN TABLE 1 OF MODEL SELECTION GUIDE

Typical mounting dimensions for reference only

**Mounting**

**MVX2000 & MVX3000 with rotated (vertical) process heads**

Reference Dimensions  $\frac{\text{millimeters}}{\text{inches}}$



MVX2000 & MVX3000 WITH ROTATED VERTICAL PROCESS HEADS  
MODEL ...R IN TABLE 1 OF MODEL SELECTION GUIDE

Typical mounting dimensions for reference only

## Ordering information

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below. Or, visit Honeywell on the World Wide Web at: <http://www.honeywell.com>.

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FAX: 1-800-565-4130

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Specifications are subject to change without notice.

Model Selection Guides are subject to change and are inserted into the specifications as guidance only. Prior to specifying or ordering a model check for the latest revision Model Selection Guides which are published at: <http://hpsweb.honeywell.com/Cultures/en-US/Products/Instrumentation/ProductModelSelectionGuides/default.htm>

## Model Selection Guide

# MVX 2000 Multivariable Pressure Transducer Differential Pressure - Static Pressure

Model Selection Guide  
34-ST-16-49 Issue 11

### 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.

Key Number      I                      II                      III (Optional)                      IV  
 MXA045 - [ ] - [ ] - [ ] + [ ]

### KEY NUMBER

Differential Pressure Range	Absolute Pressure Range	Selection	Avail.
0 to ±400" H <sub>2</sub> O (0 to ±1,000 mbar)	0 to 1,500 psia (105 bara)	MXA045	↓

TABLE I - METER BODY

	Process Heads	Vent/Drain Valves & Plugs <sup>2</sup>	Barrier Diaphragms	Selection	
Materials of Construction	Carbon Steel <sup>1</sup> 316 SS <sup>3</sup>	316 SS 316 SS	316L SS 316L SS	A__ E__	• •
Fill Fluid	DC <sup>®</sup> 200 Silicone			_ 1 _	•
Process Head Configuration	1/4" NPT Rotated (Vertical) Process Heads with 1/4" NPT			__ A __ R	• •

<sup>1</sup> Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use 316 stainless steel wetted Process Heads.

<sup>2</sup> Vent/Drains are sealed with Teflon<sup>®</sup> or PTFE.

<sup>3</sup> Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.

TABLE II

No Selection	00000	•
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TABLE III - OPTIONS

None	00	•
Viton <sup>®</sup> Process Head Gaskets	VT	•
316 SS Bolts and Nuts	SS	•
Characterization data provided by electronic mail	CD	•

TABLE IV

Factory Identification	XXXX	•
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Viton<sup>®</sup> is a registered trademark of DuPont Performance Elastomers.

DC<sup>®</sup> 200 is a registered trademark of Dow Corning

Teflon<sup>®</sup> is a registered trademark of DuPont.

Ordering Example: MXA045-A1A-00000-VT + XXXX

**For More Information**

Learn more about how Honeywell's MVX 2000 Multivariable Pressure Transducer, visit our website [www.honeywell.com/ps](http://www.honeywell.com/ps) or contact your Honeywell account manager.

**Honeywell Process Solutions**

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