SMV 3000 Smart Multivariable Flow Transmitter

Specifications

34-SM-03-01 August 2010

Introduction

The SMV 3000 combines integrated sensor and microprocessor technologies as well as dynamic flow compensation to produce the most accurate and consistent flow measurement possible, and is based on ST 3000 technology which is the most reliable in the industry. These features help improve product yield, increase process efficiency and enhance plant safety. In addition to the advantages of superior accuracy and reliability, the SMV 3000 Smart Multivariable Flow Transmitter significantly lowers your lifetime cost of ownership in several ways.

Models		
SMA110	0 to 100 psia	0-1in / 25 inH_2O
SMA125	0 to 750 psia	0-1in / 400 inH_2O
SMG170	0 to 3,000 psi	0-1in / 400 inH_2O

Installation - Wiring cost savings are achieved, as well as reduced costs of piping, manifolds, mounting, safety barriers, etc., with the SMV 3000 due to its unique ability to measure both differential and static pressure with a single sensor, and Process Temperature with an external RTD or thermocouple.
By dynamically calculating the compensated mass flow, the SMV 3000 totally eliminates the need for a dedicated flow computer, or it can free your control system from performing this function.

Commissioning - The Hand-held SFC III Smart Field Communicator or SCT 3000 Smart Configuration Toolkit lets a single technician remotely configure SMV 3000 Smart Multivariable Flow Transmitters and re-range them when application requirements change. The SCT must be used to configure the advanced flow parameters

Maintenance - The SMV 3000 offers greater accuracy and stability, reducing the frequency of calibration. Self-diagnostics can automatically indicate impending problems before they affect reliability or accuracy. Also, a single technician can diagnose problems remotely, using the SFC, SCT 3000 or TPS Global User Station, saving time and reducing cost. The SMV 3000 also provides improved reliability with a single device replacing up to three transmitters.

Inventory stocking - Enhanced reliability, combined with the high turndown capability of the SMV 3000, reduces the quantity of instruments needed to stock as backups for the installed transmitters.

Figure 1 - SMV 3000 Smart Multivariable Flow Transmitter

Key Features

- Unique single capsule sensor design provides highly accurate measurements of differential pressure, absolute or gauge pressure and meter body temperature.
- 3 process measurements (DP, SP and Temp.) and a flow calculation from a single transmitter.
- Flexible Electronics design allows RTD or Thermocouple Input with standard wiring.
- "Smart" features include remote communication, calibration, configuration and diagnostics.
- Flexible software allows flow calculation for liquids, gases and steam.
- Performs dynamic mass and volume flowrate compensation for Orifice meters and Laminar Flow Elements for highest accuracy. Standard compensation supports other primary flow elements:
  - Venturi
  - Nozzle
  - Averaging Pitot Tube
- Digital integration with Honeywell control systems provides local measurement accuracy to the system level

Description

Honeywell's **SMV 3000 Smart Multivariable Flow Transmitter** extends our proven "smart" technology to the measurement of three separate process variables simultaneously with the ability to calculate compensated mass or volume flow rate as a fourth process variable according to industry standard methods for air, gases, steam and liquids. It measures differential pressure and absolute or gauge pressure from a single sensor and temperature from a standard 100-ohm Resistance Temperature Detector (RTD) or thermocouple type E, J, K, or T input signals.
The SMV 3000's flow calculation may include compensation of pressure and/or temperature as well as more complex variables such as viscosity, discharge coefficient, thermal expansion factor, velocity of approach factor and gas expansion factor.

Functions

Proven Pressure Sensor Technology with characterization

The SMV 3000 utilizes proven 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, an absolute or gauge 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 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 transmitter EPROM are then used by the microprocessor to calculate highly accurate pressure and temperature compensated values for the differential pressure and static pressure measurements.

In this way, the SMV 3000 can provide an output signal that is stable and fully compensated for changes in process pressure and ambient temperature over a very wide range. Microprocessor-based electronics coupled with the sensor characterization provide higher span-turndown ratio, improved temperature and pressure compensation, and improved accuracy.

Process Temperature Measurement and Compensation

Similar to the differential and static pressure measurements, the SMV 3000's temperature electronics are characterized for ambient temperature changes so that the resistance or millivolt input from a Pt. 100 Ohm RTD or Type J, K, T or E Thermocouple is compensated for ambient temperature effects and therefore can be reported as the most accurate temperature possible. The SMV 3000's flexibility allows the connection of either a standard 2, 3 or 4 wire 100 ohm RTD or a Type J, K, T or E thermocouple without special installation consideration. RTDs, thermocouples and thermowells can be ordered from Honeywell under this specification.

Mass Flow Measurements for Steam, Air, Gas or Liquid

The SMV 3000 includes flow equations for steam, air, gas and liquids so that one model is all you need in your plant. The mass flow equation with dynamic compensation (Equation 1) is based on the ASME MFC-3M-1989 standard for orifice meters.

Equation 1:

$$Q_m = NCE_vY_1d^2\sqrt{h_w\rho_f}$$

Where,

Q_m = mass flowrate
N = units conversion factor
C = discharge coefficient
Y_1 - gas expansion factor
E_v = velocity of approach factor
ρ_f = density at flowing conditions
h_w = differential pressure
d = bore diameter

SMV 3000 Flow Compensation

Most differential pressure transmitters utilized in steam, gas and liquid flow applications today measure the differential pressure across a primary flow element and report it to a DCS, PLC or flow computer for flow calculation. Most often, the calculation inside assumes that the density of the fluid is constant per the following equation.

$$Q_v = K\sqrt{\frac{h_w}{\rho}}$$

Where,

Q_v = volumetric flowrate
h_w = differential pressure
K = flow factor
ρ = flowing density

In other applications, one will take the equation a step further and compensate for changes in pressure and temperature using additional pressure and temperature transmitters. For example, if a gas is being measured, the following volumetric flow equation based on multiple transmitters - the "Old" approach - applies (Figure 2). Or, in the case of Mass flowrate,

$$Q_m = K\sqrt{h_w\frac{P}{T}}$$

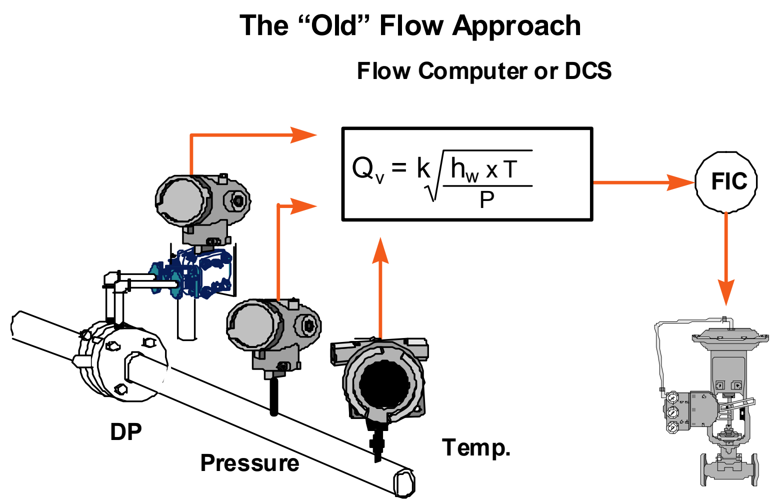

Figure 2 —Flow Compensation Using the "Old" Approach

Today, the three key measurements (differential pressure, static pressure and process temperature) and the flow calculation can be made with one multivariable transmitter. So, whether you just want to compensate for density or use full dynamic flow compensation, consider the SMV 3000 and the "Enhanced" flow approach (Figure 3). Unlike most DP transmitters, the SMV 3000 with dynamic compensation can correct flow errors due to the K factor. Per Equation 1, the K factor is not a constant and can vary:

$$k = NCE_v Y_1 d^2$$

Description of Flow Variables for Dynamic Flow Compensation

Dynamic flow compensation is the process of measuring the required variables (differential pressure, static pressure and temperature) and using these variables to perform real time, calculations of variables such as density, viscosity, Reynolds number, discharge coefficient, thermal expansion factor and gas expansion factor - all which can affect the accuracy of your mass flow measurement.

With the SMV 3000, you have the flexibility to choose which variables you need to compensate. For example, the transmitter can be easily configured to compensate for density only and calculate flowrate via a standard equation. If you have a liquid, steam or gas application with small flow turndown requirements, choose the easy, standard equation and in minutes your mass or volumetric flowrate is compensated for density changes.

On the other hand, if you have a more demanding flow application utilizing an orifice plate or laminar flow element that requires high accuracy at larger flow turndowns, choose the more complex mass or volumetric flow equation and compensate for density as well as other variables such as viscosity, discharge coefficient, gas expansion factor, velocity of approach factor and thermal expansion factor.

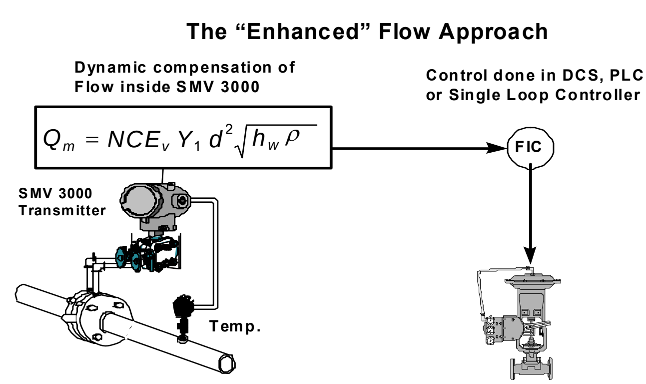

Figure 3 —**Flow Compensation Using the "Enhanced" Approach**

Discharge Coefficient

Discharge coefficient is defined as the true flowrate divided by the theoretical flowrate and corrects the theoretical equation for the influence of velocity profile (Reynolds number), the assumption of no energy loss between taps, and pressure tap location. It is dependent on the primary flow element, the β ratio and the Reynolds number. Reynolds number is in turn dependent on the viscosity, density and velocity of the fluid as well as the pipe diameter per the following equation:

$$Re = \frac{vD\rho}{\upsilon}$$

where,

ν = velocity
D = inside pipe diameter
ρ = fluid density
μ = fluid viscosity

The SMV 3000 can be configured to dynamically compensate for discharge coefficient.
This method follows the standard Stoltz equation for orifice, Venturi and nozzle primary elements to predict discharge coefficient for flowrate in the turbulent regime -
Re > 4000.

$$C = C_\infty + \frac{b}{Re^n}$$

Where,

C_∞ = Discharge coefficient at infinite Re #
b = function of primary element
Re = Reynolds number
n = depends on the primary element

Dynamically compensating for discharge coefficient allows the SMV 3000 to obtain better flow accuracy at higher turndowns for orifice, Venturi and nozzles.

Thermal Expansion Factor

The material of the process pipe and primary flow element expands or contracts with changes in temperature of the fluid being measured. When a primary flow element, such as an orifice, is sized, the flowrate is calculated based on the Beta ratio (d/D) at 68 degrees F. The SMV 3000, using the thermal expansion coefficients which are dependent of the material of the pipe and flow element, calculates the change in Beta ratio per the following equations:

$$\beta = d/D$$

$$D = 1 + \alpha_p(T_f - 68)D_{ref}$$

$$d = 1 + \alpha_{pe}(T_f - 68)d_{ref}$$

where,

β = beta ratio
D = pipe diameter
d = bore diameter
D_{ref} = pipe diameter at design temperature
d_{ref} = bore diameter at design temperature
α_p = Thermal Expansion Coef. of pipe
α_{pe} = Thermal Expansion Coef. of bore
T_f = flowing temperature

As an example, a fluid at 600 degrees F could cause as much as 1% error in flow measurement using 300 series stainless steel materials.

Gas Expansion Factor

The gas expansion factor corrects for density differences between pressure taps due to expansion of compressible fluids. It does not apply for liquids which are essentially non-compressible and approaches unity when there are small differential pressures for gas and steam measurements. The gas expansion factor is dependent on the Beta ratio, the Isentropic exponent, the differential pressure and the static pressure of the fluid per the following equation:

$$Y_1 = 1 - (0.41 + 0.35\beta^4)X_1/k$$

where,

β = beta ratio
$X_1 = h_w / P$
k = isentropic exp. (ratio of specific heats)

The SMV 3000 dynamically compensates for gas expansion effects and provides better mass flow accuracy, especially for low static pressure applications.

Velocity of Approach Factor

E_v is dependent on the Beta ratio as defined by the following equation:

$$E_v = 1/\sqrt{1 - B^4}$$

In turn, Beta ratio is dependent on the bore diameter and pipe diameter which are functions of temperature. The SMV 3000 compensates dynamically for velocity of approach factor by calculating the true Beta ratio at flowing temperature. This ensures high flowrate accuracy at low and high temperature applications.

Density and Viscosity of Fluids

Density directly effects the flowrate calculation as well as the discharge coefficient due to changes in the Reynolds number. The SMV 3000 can be configured to compensate for density of fluids due to changes in the temperature and/or pressure per the following:

- Gases as a function of P and T per the Gas Law Equations.
- Steam as function of P and T based on the ASME Tables.
- Liquids as a function of T per a 5th Order Polynomial.

$$\rho = d_1 + d_2T_F + d_3T_F^2 + d_4T_F^3 + d_5T_F^4$$

Changes in the viscosity of a fluid due to changes in temperature can also effect the Reynolds number and therefore discharge coefficient. The SMV 3000 can compensate the viscosity of liquids based on the following 5th order polynomial equation:

$$\mu = v_1 + v_2T_F + v_3T_F^2 + v_4T_F^3 + v_5T_F$$

Support of Proprietary Flow Elements

The SMV 3000 with dynamic flow compensation supports orifice meters and the Meriam Laminar Flow Elements. The SMV 3000 with density compensation supports other flow elements such as Venturi meters, nozzles, averaging pitot tubes.

Averaging Pitot Tubes

Averaging pitot tubes are a low differential pressure, insertion type flow element and can be used in clean steam, air, gas and liquid applications. Since averaging pitot tubes are insertion type elements, they have lower installation costs than many other primary flow elements. The SMV 3000 can be configured to compensate for density and calculate flowrate for liquids, gases and steam utilizing averaging pitot tubes (Figure 4).

Figure 4 —SMV 3000 with Averaging Pitot Tube

Meriam Laminar Flow Element

Laminar Flow Elements (Figure 5) are gas volume rate of flow differential producers operating on capillary flow principles and are similar to averaging pitot tubes in that they are low differential pressure producers. They are applicable over wider flow ranges than conventional types of primary flow elements and are ideally suited for measurements of combustion air and gases such as argon, helium and nitrogen. Laminar Flow Elements behave according to the following flow formulas and can be configured for standard volumetric flowrate:

$$Q_v = (B \times h_w + C \times h_w^2) \cdot (\mu_s/\mu_w) \cdot (T_s/T_f) \cdot (P_f/P_s) \cdot (\rho_w/\rho_d)$$

Where,

Q_v = standard volumetric flowrate
B & C = calibration constants
h_w = differential pressure
μ_s = standard viscosity
T_f = flowing temperature
P_f = flowing pressure
ρ_w = wet air density
ρ_d = dry air density

And for mass flowrate:

$$Q_m = Q_v \cdot \rho$$

Where,

Q_m = standard volumetric flowrate
ρ = density at standard conditions

The relationship between flowrate and differential pressure can be determined two ways.

The first method uses a 6th order polynomial equation that custom fits the flow element. The second method is an n-segment fit (maximum n = 5) between flow and differential pressure which also custom fits the flow element.

Figure 5 —SMV 3000 with Meriam Laminar Flow Elements

The SMV 3000 can use either one of these methods as well as compensate for density and viscosity to increase the accuracy of the flow measurement for the Laminar Flow Element over greater flow turndowns.

Smart Technology Delivers Broad Benefits and Reduces Total Cost of Ownership

Other Multivariable Applications

Most multivariable transmitters are used in flow applications. However, there are other applications which require that multiple process variables (DP, AP and T) be transmitted to a control system - DCS or PLC. It is in the control system where a calculation such as compensated level for liquid level applications or complex calculations to infer composition in distillation columns are performed. A SMV 3000 in these applications can save substantial wiring, installation and purchase costs versus 2 or 3 separate single-variable transmitters. Whether integrating digitally to a Experion/TDC/TPS 3000 Control System or providing 4 analog 1-5 V outputs to a PLC or DCS via the MVA Multivariable Analog Card, the SMV 3000 is very cost effective in multivariable applications.

Figure 6 — Smart Field Communicator

Smart Configuration Flexibility

Like other Smartline Transmitters, the SMV 3000 features two-way communication between the operator and the transmitter via the SCT 3000 Smart Configuration Toolkit or SFC - Smart Field Communicator or MC Toolkit. You connect the SFC or SCT anywhere that you can access the transmitter signal lines. These communicators provide the capabilities of transmitter adjustments and diagnostics from remote locations, such as the field installation, I/O rack or control room. The SFC and SCT3000 support other Smartline Instruments too: ST 3000, STT 3000.

Figure 7 — MC Tookit

The SCT 3000 has an advantage over the SFC in that it can also be used to configure the complete SMV 3000 database and save this database for later access. The SCT 3000 is a software package and hardware interface which runs on an IBM compatible computer utilizing the Windows 95, Windows 98 or Windows NT platforms. The SCT 3000 must be used to configure the advanced flow parameters for the SMV 3000.

Figure 8 — SCT 3000

Digital Integration Links the SMV 3000 to Experion and TDC/TPS 3000 for greater process efficiency

Digital Integration combines the functions of TDC/TPS 3000 system with the strengths of the SMV 3000 to help achieve maximum productivity, by providing:

- ***Database security and integrity*** - PV Status transmission precedes the PV value, guaranteeing that a bad PV is not used in a control algorithm.
- ***Bidirectional communication and a common database for the system and the transmitter*** - Data upload and download capability lowers transmitter installation costs.
- ***Single-window diagnostics for the transmitter (electronics and meter body) and loop*** - Remote troubleshooting reduces maintenance effort and expedites repairs.
- ***Automatic historization of all transmitter parameter changes*** - System maintenance log automatically provides audit trail of changes.
- ***Enhanced accuracy*** - Elimination of D/A and A/D converters improves measurement accuracy.

Digital Integration of the SMV 3000 Smart Multivariable Flow Transmitter with Experion/TDC/TPS 3000 allows you to combine advanced transmitter technology with our state-of-the-art, process connected controllers - the Process Manager, Advanced Process Manager and High Performance Process Manager.

Digital Integration of the SMV 3000 Smart Multivariable Flow Transmitter with Experion/TDC/TPS 3000 improves the integrity of the process data measurements, letting you monitor process variability with greater accuracy. Accurate and more reliable data lets you implement advanced control strategies, providing greater bottom-line profits.

MVA Provides Integration with Analog Systems

The MultiVariable Analog (MVA) interface in Figure 6 provides a cost effective way to interface with analog instrumentation while utilizing all the advantages of Honeywell's digitally enhanced (DE) communications.

The MVA is fully compatible with all Honeywell Smartline™ transmitters. This includes the SMV 3000 Smart Multivariable Transmitter, ST 3000 Smart Pressure Transmitters, STT 3000 Smart Temperature Transmitter. The MVA also works in conjunction with any of Honeywell's DE control system interfaces (STDC, STI-MV). In addition, Honeywell's handheld communicators, SFC III and SCT 3000 and the MC Tool kit, may be used with no disturbances to the analog outputs or device status. MVA accepts the digital DE signal from any Smartline™ transmitter and outputs analog signals. Digitally integrated to the SMV 3000, the MVA can provide up to 4 analog 1-5 Volt outputs for differential pressure, static pressure, temperature and compensated flowrate. This provides an economical means of integrating SMV 3000 in analog applications when all process variables are required.

Figure 6 —MultiVariable Analog Interface

MVA141 Ordered Separately under Spec. 34-MV-03-01

SMV 3000 Specifications

Operating Conditions

Parameter	Reference Condition	Rated Condition	Operative Limits	Transportation and Storage
Ambient Temperature **°C** **°F**	25 ±1 77 ±2	–40 to 85 –40 to 185	–40 to 93 –40 to 200	–55 to 125 –67 to 257
Meter Body Temperature **°C** **°F**	25 ±1 77 ±2	–40 to 110 [1] –40 to 230 [1]	–40 to 125 [1] –40 to 257 [1]	–55 to 125 –67 to 257
Humidity **%RH**	10 to 55	0 to 100	0 to 100	0 to 100
Vacuum Region - Minimum Pressure **mmHg absolute** **inH$_2$O absolute**	Atmospheric Atmospheric	25 13	2 (short term[2]) 1 (short term[2])	
Supply Voltage, Current, and Load Resistance	**Voltage Range:** 10.8 to 42.4 Vdc at terminals **Current Range:** 3.0 to 20.8 mA **Load Resistance:** 0 to 1440 ohms (as shown in Figure 7).			
Maximum Allowable Working Pressure (MAWP) [4] (ST 3000 products are rated to Maximum Allowable Working Pressure. MAWP depends on Approval Agency and transmitter materials of construction.)	SMA110 = 100 psi, 7 bar [3] SMA125 = 3,000 psi, 210 bar [3] SMG170 = 3,000 psi, 210 bar [3] Static Pressure Limit = Maximum Allowable Working Pressure (MAWP) = Overpressure Limit			

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

[2] Short term equals 2 hours at 70°C (158°F).

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

[4] Consult factory for MAWP of transmitters that require CSA approval (CRN)

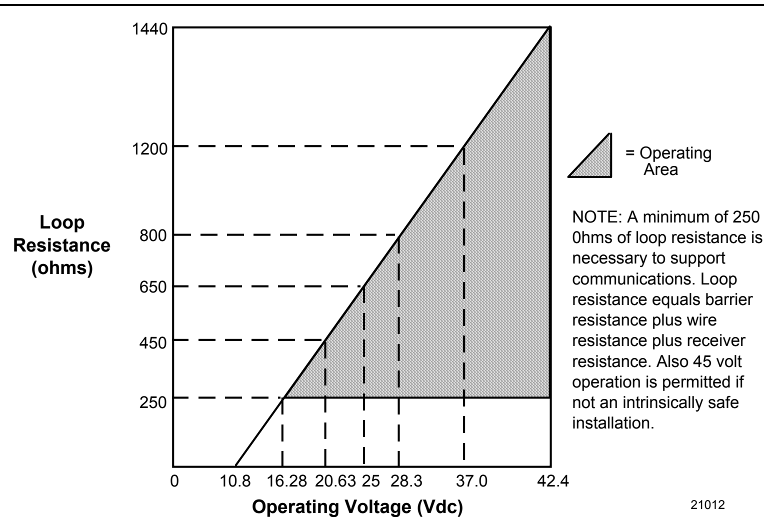

Figure 7 —Supply Voltage and Loop Resistance Chart.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Differential Pressure Measurement - SMA110

Parameter	Description
Upper Range Limit	± 25 inH_2O (62.5 mbar) at 39.2°F (4°C) standard reference temperature for inches of water measurement range.
Turndown Ratio	25 to 1
Minimum Span	±1.0 inH_2O (2.5 mbar)
Zero Elevation and Suppression	No limit (except minimum span) with ±100% URL.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.125% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (10 inH_2O), accuracy equals: $\pm\left[0.025+0.1\left(\frac{10\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.025+0.1\left(\frac{25\ mbar}{span\ mbar}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.1% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (10 inH_2O), accuracy equals: $\pm 0.1\left(\frac{10\ inH_2O}{span\ inH_2O}\right)$ or $\pm 0.1\left(\frac{25\ mbar}{span\ mbar}\right)$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.525% of calibrated span. For URV below reference point (10 inH_2O), effect equals: $\pm\left[0.025+0.50\left(\frac{10\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.025+0.50\left(\frac{25\ mbar}{span\ mbar}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.5% of calibrated span. For URV below reference point (10 inH_2O), effect equals: $\pm 0.50\left(\frac{10\ inH_2O}{span\ inH_2O}\right)$ or $\pm 0.50\left(\frac{25\ mbar}{span\ mbar}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.675% of calibrated span. For URV below reference point (10 inH_2O), effect equals: $\pm\left[0.175+0.50\left(\frac{10\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.175+0.50\left(\frac{25\ mbar}{span\ mbar}\right)\right]$ in % of span ***In Digital Mode:*** ±0. 625% of calibrated span. For URV below reference point (10 inH_2O), effect equals: $\pm\left[0.125+0.50\left(\frac{10\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.125+0.50\left(\frac{25\ mbar}{span\ mbar}\right)\right]$ in % of span
Stability (At Reference Conditions)	±1.0% of URL per year.
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Differential Pressure Measurement - SMA125

Parameter	Description
Upper Range Limit	±400 inH_2O (1000 mbar) at 39.2°F (4°C) standard reference temperature for inches of water measurement range.
Turndown Ratio	400 : 1
Minimum Span	±1 inH_2O (2.5 mbar)
Zero Elevation and Suppression	No limit (except minimum span) with ±100% URL.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.10% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (25 inH_2O), accuracy equals: $\pm\left[0.025+0.075\left(\frac{25\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.025+0.075\left(\frac{62\ mbar}{span\ mbar}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.075% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (25 inH_2O), accuracy equals: $\pm\left[0.0125+0.0625\left(\frac{25\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.0125+0.0625\left(\frac{62\ mbar}{span\ mbar}\right)\right]$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1125% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm\left[0.0125+0.10\left(\frac{50\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.0125+0.10\left(\frac{125\ mbar}{span\ mbar}\right)\right]$ in % of span ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm 0.10\left(\frac{50\ inH_2O}{span\ inH_2O}\right)$ or $\pm 0.10\left(\frac{125\ mbar}{span\ mbar}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.2625% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm\left[0.1625+0.10\left(\frac{50\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.1625+0.10\left(\frac{125\ mbar}{span\ mbar}\right)\right]$ in % of span ***In Digital Mode:*** ±0.225% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm\left[0.125+0.10\left(\frac{50\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.125+0.10\left(\frac{125\ mbar}{span\ mbar}\right)\right]$ in % of span
Zero Static Pressure Effect per 1,000 psi (70 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.24% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm\left[0.05+0.19\left(\frac{50\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.05+0.19\left(\frac{125\ mbar}{span\ mbar}\right)\right]$ in % of span
Combined Zero and Span Static Pressure Effect per 1,000 psi (70 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±1.04% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm\left[0.85+0.19\left(\frac{50\ inH_2O}{span\ inH_2O}\right)\right]$ or $\pm\left[0.85+0.19\left(\frac{125\ mbar}{span\ mbar}\right)\right]$ in % of span
Stability (At Reference Conditions)	±0.0625% of URL per year.
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Differential Pressure Measurement - SMG170

Parameter	Description
Upper Range Limit	400 inH_2O (1000 mbar) at 39.2°F (4°C) standard reference temperature for inches of water measurement range.
Turndown Ratio	400 to 1
Minimum Span	1 inH_2O (2.5 mbar)
Zero Elevation and Suppression	No limit (except minimum span) with ±100% URL. Specifications valid from –5 to +100% URL.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.10% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (50 inH_2O), accuracy equals: $\pm\left[0.025 + 0.075\left(\frac{50\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.025 + 0.075\left(\frac{125\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.075% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (50 inH_2O), accuracy equals: $\pm\left[0.0125 + 0.0625\left(\frac{50\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.0125 + 0.0625\left(\frac{125\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1375% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm\left[0.0125 + 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.0125 + 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.125% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.35% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm\left[0.225 + 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.225 + 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.325% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm\left[0.20 + 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.20 + 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span.
Zero Static Pressure Effect per 1,000 psi (68 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.15% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm\left[0.025 + 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.025 + 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span.
Combined Zero and Span Static Pressure Effect per 1,000 psi (68 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.35% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm\left[0.225 + 0.125\left(\frac{100\ \text{inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)\right]$ or $\pm\left[0.225 + 0.125\left(\frac{250\ \text{mbar}}{\text{span mbar}}\right)\right]$ in % of span.
Stability (At Reference Conditions)	±0.0625% of URL per year.
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Absolute Pressure Measurement - SMA110

Parameter	Description
Upper Range Limit (URL)	100 psia (7 bara)
Turndown Ratio	20 to 1
Minimum Span	5 psia (.35 bara)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.10% of calibrated span or upper range value (URV), whichever is greater - Terminal based. For URV below reference point (20 psi), accuracy equals: $\pm\left[0.025+0.075\left(\frac{20\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.025+0.075\left(\frac{1.4\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.075% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (20 psi), accuracy equals: $\pm\left[0.0125+0.0625\left(\frac{20\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.0125+0.0625\left(\frac{1.4\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.125% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm\left[0.025+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.025+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm 0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)$ or $\pm 0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.2625% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm\left[0.1625+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.1625+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.225% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm\left[0.125+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.125+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Stability (At Reference Conditions)	±0.125% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Absolute Pressure Measurement - SMA125

Parameter	Description
Upper Range Limit (URL)	750 psia (52 bara)
Turndown Ratio	150 to 1
Minimum Span	5 psia (0.3 bara)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.10% of calibrated span or upper range value (URV), whichever is greater - Terminal based. For URV below reference point (20 psi), accuracy equals: $\pm\left[0.025+0.075\left(\frac{20\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.025+0.075\left(\frac{1.4\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.075% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (20 psi), accuracy equals: $\pm\left[0.0125+0.0625\left(\frac{20\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.0125+0.0625\left(\frac{1.4\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1125% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm\left[0.0125+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.0125+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm 0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)$ or $\pm 0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.2625% of calibrated span. For URV below reference point (50 psi), effect equals: $\pm\left[0.1625+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.1625+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.225% of calibrated span. $\pm\left[0.125+0.10\left(\frac{50\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.125+0.10\left(\frac{3.5\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Stability (At Reference Conditions)	±0.016% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions[5] - Gauge Pressure Measurement - SMG170

Parameter	Description
Upper Range Limit (URL)	3,000 psig (210 barg)
Turndown Ratio	50 to 1
Minimum Span	60 psig (1.04 barg)
Zero Suppression	No limit (except minimum span) from absolute zero to 100% URL. Specifications valid over this range.
Accuracy (Reference – Includes combined effects of linearity, hysteresis, and repeatability) • *Applies for model with Stainless Steel barrier diaphragms* • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode:*** ±0.10% of calibrated span or upper range value (URV), whichever is greater - Terminal based. For URV below reference point (300 psi), accuracy equals: $\pm\left[0.025+0.075\left(\frac{300\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.025+0.075\left(\frac{21\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.075% of calibrated span or upper range value (URV), whichever is greater, - Terminal based. For URV below reference point (300 psi), accuracy equals: $\pm\left[0.0125+0.0625\left(\frac{300\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.0125+0.0625\left(\frac{21\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Zero Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1125% of calibrated span. For URV below reference point (300 psi), effect equals: $\pm\left[0.0125+0.10\left(\frac{300\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.0125+0.10\left(\frac{21\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (300 psi), effect equals: $\pm 0.10\left(\frac{300\ \text{psi}}{\text{span psi}}\right)$ or $\pm 0.10\left(\frac{21\ \text{bar}}{\text{span bar}}\right)$ in % of span.
Combined Zero and Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.25% of calibrated span. For URV below reference point (300 psi), effect equals: $\pm\left[0.15+0.10\left(\frac{300\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.15+0.10\left(\frac{21\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span. ***In Digital Mode:*** ±0.225% of calibrated span. For URV below reference point (300 psi), effect equals: $\pm\left[0.125+0.10\left(\frac{300\ \text{psi}}{\text{span psi}}\right)\right]$ or $\pm\left[0.125+0.10\left(\frac{21\ \text{bar}}{\text{span bar}}\right)\right]$ in % of span.
Stability (At Reference Conditions)	±0.025% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

[5] 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.

SMV 3000 Specifications, continued

Performance Under Rated Conditions - Process Temperature Measurement

Probe Type	Digital Accuracy (Ref.)[6]		Rated Range Limits		Operative Range Limits		Standards
	°C	°F	°C	°F	°C	°F	
RTD							
Platinum 100-ohm	±0.6	±1.0	–200 to 450	–328 to 842	–200 to 850	–328 to 1562	DIN 43760
Thermocouple							
E	±1.0	±1.8	0 to 1,000	32 to 1,832	–200 to 1,000	–328 to 1,832	IEC584.1
J	±1.0	±1.8	0 to 1,200	32 to 2,192	–200 to 1,200	–328 to 2,192	IEC584.1
K	±1.0	±1.8	–100 to 1,250	–148 to 2,282	–200 to 1,370	–328 to 2,498	IEC584.1
T	±1.0	±1.8	–100 to 400	–148 to 752	–250 to 400	–418 to 752	IEC584.1

[6] Add ±0.025% of calibrated span for transmitter operating in analog mode.

Parameter	Description
Adjustment Range	Select zero and span output for any input from 0% to +100% of the upper range limit (operative limit) shown above for each probe type. Specifications only apply to rated limit.
Output D/A Accuracy	±0.025% of span.
Minimum Span	±10°C
Total Reference Accuracy • *Accuracy includes residual error after averaging successive readings.*	***In Analog Mode*** = Digital Accuracy + Output D/A Accuracy ***In Digital Mode*** = Digital Accuracy
Combined Zero and Span Temperature Effect	***In Digital Mode:*** RTD = None Thermocouple ≤ ±0.10% of input mV per 28°C (50°F) ±CJ Rejection ***In Analog Mode:*** Add ±0.15% of calibrated span to calculation for digital mode above.
Cold Junction Rejection	40 to 1
Thermocouple Burnout	Burnout (open lead) detection is user selectable: ON = upscale or downscale failsafe action with critical status message for any open lead.
Drift (At Reference Conditions)	±1.0°C (1.8°F) per year.
Damping Time Constant	Adjustable from 0 to 102 seconds digital damping.

Performance Under Rated Conditions - Flowrate Calculation

Mass Flowrate Accuracy
±1.0% of mass flowrate over an 8:1 flow range (64:1 DP range) for steam, air and liquids for a ASME MFC3M - ISO 1567 Orifice meter with flange taps.

Performance Under Rated Conditions - General

Parameter	Description
Output (two-wire)	Analog 4 to 20 mA or digital (DE protocol).
Power Supply Voltage Effect	0.005% of span per volt.

SMV 3000 Specifications, continued

Physical

Parameter	Description
Barrier Diaphragms Material SMA110 SMA125 SMG170	 316L SS 316L SS, Hastelloy® C -276[7], Monel 400®[8] and Tantalum 316L SS, Hastelloy® C -276[7]
Process Head Material SMA110 SMA125 SMG170	 Carbon Steel (Zinc-Plated) [11] or 316L SS Carbon Steel (Zinc-Plated) [11], 316L SS, Hastelloy® C -276[9] or Monel 400®[10]. Carbon Steel (Zinc-Plated) [11], 316L SS, or Hastelloy® C -276[9].
Vent/Drain Valves & Plugs [1]	316 SS, Hastelloy® C-276[7], Monel 400®[8]
Head Gaskets	Glass filled PTFE standard. Viton® is optional
Meter Body Bolting	Carbon Steel (Zinc plated) standard. Options include 316 SS, NACE A286 SS bolts and 304 SS nuts and B7M.
Optional Adapter Flange and Bolts	Adapter Flange materials include 316L SS, Hastelloy® C-276[9] and Monel 400®[10]. Bolt material for flanges is dependent on process head bolts material chosen. Standard adaptor o-ring material is glass-filled PTFE. Viton® and graphite are optional.
Mounting Bracket	Carbon Steel (Zinc-plated) available in angle or flat style.
Fill Fluid	DC® 200 Silicone oil or CTFE (Chlorotrifluoroethylene).
Electronic Housing	Epoxy-polyester hybrid paint Low Copper-Aluminum. Meets NEMA 4X (watertight) and NEMA 7 (explosion-proof).
Process Connections	1/4-inch NPT (Option 1/2-inch NPT with adapter).
Wiring	Accepts up to 16 AWG (1.5 mm diameter).
Dimensions	See Figure 8.
Net Weight	5.3 Kg (11.6 lb)
Mounting	See Figure 9.

[1] Vent/Drains are sealed with Teflon® or PTFE

[7] Hastelloy® C-276 or UNS N10276

[8] Monel 400® or UNS N04400

[9] Hastelloy® C-276 or UNS N10276. Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy® C-276

[10] Monel 400® or UNS N04400. Supplied as indicated or as Grade M30C, the casting equivalent of Monel 400®

[11] Carbon Steel heads are zinc-plated and not recommended for water service due to hydrogen migration. For that service, use 316L stainless steel wetted Process Heads.

Certifications

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
FM Approvals^{SM}	**Explosionproof:** Class I, Division 1, Groups A, B, C, D locations **Dust Ignition Proof:** Class II, III, Division 1, Groups E, F, G locations, Enclosure Type 4X	All	All	T5 Ta = 93ºC
	Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G locations, Enclosure Type 4X	4-20 mA / DE	Vmax = 42.4V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		4-20 mA /	Vmax = 30V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
	Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G locations; Class 1, Zone 0, AEx ia Group IIC, Enclosure Type 4X / IP 66/67	Fieldbus – Entity (Not FISCO)	Vmax = 32V Imax = 120mA Ci = 4.2nF Li = 0 Pi =0.84W	T4 Ta = 40ºC T3 Ta = 93ºC
		Fieldbus – Entity (Not FISCO)	Vmax = 24V Imax = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T4 Ta = 40ºC T3 Ta = 93ºC
		FISCO	Vmax = 17.5V Imax = 380mA Ci = 4.2nF Li = 0 Pi =5.32W	T4 Ta = 40ºC T3 Ta = 93ºC
	Nonincendive: Class I, Division 2, Groups A, B, C, D locations, Enclosure Type 4X	4-20 mA / DE	Vmax = 42.4V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		4-20 mA / HART	Vmax = 30V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
	Nonincendive: Class I, Division 2, Groups A, B, C, D; Suitable for: Class II, Division 2, Groups F&G; Class III, Division 2; Class I, Zone 2, Group IIC, Enclosure Type 4X / IP 66/67	Fieldbus – Entity (Not FNICO)	Vmax = 32V Imax = 120mA Ci = 4.2nF Li = 0 Pi =0.84W	T4 Ta = 40ºC T3 Ta = 93ºC
		Fieldbus – Entity (Not FNICO)	Vmax = 24V Imax = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T4 Ta = 40ºC T3 Ta = 93ºC
		FNICO	Vmax = 32V Ci = 4.2nF Li = 0	T4 Ta = 40ºC T3 Ta = 93ºC

Li = 0 except Li = 150µH when Option ME, Analog Meter, is selected.

FM Approvals^{SM} is a service mark of FM Global

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
Canadian Standards Association (CSA)	**Explosion Proof:** Class I, Division 1, Groups B, C, D locations **Dust Ignition Proof:** Class II, III, Division 1, Groups E, F, G locations, Enclosure Type 4X	All	All	T4 Ta = 93ºC
	Intrinsically Safe: Class I, II, III, Division 1, Groups A, B, C, D, E, F, G locations, Enclosure Type 4X	4-20 mA / DE	Vmax = 42V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		4-20 mA / HART	Vmax = 42V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		Fieldbus – Entity (Not FISCO)	Vmax = 24V Imax = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T4 Ta = 40ºC T3 Ta = 93ºC
	Nonincendive: Class I, Division 2, Groups A, B, C, D locations, Enclosure Type 4X	4-20 mA / DE	Vmax = 42.4V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		4-20 mA / HART	Vmax = 30V Imax = 225mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = 93ºC
		Fieldbus – Entity (Not FNICO)	Vmax = 24V Imax = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T4 Ta = 40ºC T3 Ta = 93ºC
	Canadian Registration Number (CRN):	All ST 3000 models except STG19L, STG99L, STG170 and STG180 have been registered in all provinces and territories in Canada and are marked CRN: 0F8914.5C.		

* Li = 0 except Li = 150µH when Option ME, Analog Meter, is selected.

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
IECEx International Electrotechnical Commission (LCIE)	**Flameproof, Zone 1:** Ex d IIC, Enclosure IP 66/67	All	All	T5 Ta = –50 to 93ºC T6 Ta = –50 to 78ºC
	Intrinsically Safe, Zone 0/1: Ex ia IIC, Enclosure IP 66/67	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC

*Li = 0 except Li = 150μH when Option ME, Analog Meter, is selected.

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
SAEx (South Africa)	**Flameproof, Zone 1:** Ex d IIC, Enclosure IP 66/67	All	All	T5 Ta = –50 to 93ºC T6 Ta = –50 to 78ºC
	Intrinsically Safe, Zone 0/1: Ex ia IIC, Enclosure IP 66/67	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC
	Multiple Marking: **Flameproof, Zone 1:** Ex d IIC, Enclosure IP 66/67 **Intrinsically Safe, Zone 0/1:** Ex ia IIC, Enclosure IP 66/67 The user must determine the type of protection required for installation of the equipment. The user shall then check the box [√] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, subsequently the equipment shall not be reinstalled using any of the other certification types.	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC

*Li = 0 except Li = 150μH when Option ME, Analog Meter, is selected.

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
ATEX (LCIE)	**Flameproof, Zone 0:** Ex II 1 D, Ex tD Enclosure IP 66/67	All	All	A20 IP6X T95ºC Ta = 93ºC or T80ºC Ta = 78ºC
	Flameproof, Zone 1: Ex II 2 GD, Ex d IIC, Ex tD Enclosure IP 66/67	All	All	T5 Ta = –50 to +93ºC T6 Ta = –50 to +78ºC, A21 IP6X T95ºC Ta = 93ºC or T80ºC Ta = 78ºC
	Intrinsically Safe, Zone 0/1: Ex II 1 G, Ex ia IIC, Enclosure IP 66/67	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC
	Non-Sparking, Zone 2: Ex II 3 G,Ex nA IIC (Honeywell), Enclosure IP 66/67	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FNICO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC
	Multiple Marking: **Flameproof, Zone 1:** Ex II 2 G, Ex d IIC **Intrinsically Safe, Zone 0/1:** Ex II 1 G, Ex ia IIC **Non-Sparking, Zone 2:** Ex II 3 G, Ex nA IIC **NOTE:** The user must determine the type of protection required for installation of the equipment. The user shall then check the box [√] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, subsequently the equipment shall not be reinstalled using any of the other certification types.	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO/FNICO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC

*Li = 0 except Li = 150µH when Option ME, Analog Meter, is selected.

	Type of Protection	Comm. Option	Field Parameters	Temp. Codes
INMETRO (CERTUSP) Brazil	**Flameproof, Zone 1:** BR-Ex d IIC Enclosure IP 66/67	All	All	T5 Ta = –50 to 93ºC T6 Ta = –50 to 78ºC
	Intrinsically Safe, Zone 0/1: BR-Ex ia IIC Enclosure IP 66/67	4-20 mA / DE	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 85ºC T6 Ta = –50 to 70ºC
		4-20 mA / HART	Ui = 30V Ii = 100mA Ci = 4.2nF Li = * Pi =1.2W	T4 Ta = –50 to 93ºC T5 Ta = –50 to 63ºC T6 Ta = –50 to 48ºC
		Fieldbus (Not FISCO)	Ui = 24V Ii = 250mA Ci = 4.2nF Li = 0 Pi =1.2W	T3 Ta = –50 to 93ºC T4 Ta = –50 to 40ºC

- Li = 0 except Li = 150µH when Option ME, Analog Meter, is selected.

ST 3000 Pressure Transmitter Marine Certificate (MT Option)	This certificate defines the certifications covered for the ST 3000 Pressure Transmitter family of products, including the SMV 3000 Smart Multivariable Transmitter. It represents the compilation of the five certificates Honeywell currently has covering the certification of these products into marine applications. For ST 3000 Smart Pressure Transmitter and SMV 3000 Smart Multivarible Transmitter
	American Bureau of Shipping (ABS) - 2009 Steel Vessel Rules 1-1-4/3.7, 4-6-2/5.15, 4-8-3/13 & 13.5, 4-8-4/27.5.1, 4-9-7/13. Certificate number: 04-HS417416-PDA
	Bureau Veritas (BV) - Product Code: 389:1H. Certificate number: 12660/B0 BV
	Det Norske Veritas (DNV) - Location Classes: Temperature D, Humidity B, Vibration A, EMC B, Enclosure C. For salt spray exposure; enclosure of 316 SST or 2-part epoxy protection with 316 SST bolts to be applied. Certificate number: A-11476
	Korean Register of Shipping (KR) - Certificate number: LOX17743-AE001
	Lloyd's Register (LR) - Certificate number: 02/60001(E1) & (E2)

European Pressure Equipment Directive (PED) (97/23/EC)	The ST 3000 Smart Pressure Transmitters are in conformity with the essential requirements of the Pressure Equipment Directive. Honeywell ST 3000 Smart Pressure Transmitters are designed and manufactured in accordance with the applicable portions of Annex I, Essential Safety Requirements, and sound engineering practices. These transmitters have no pressurized internal volume, or have a pressurized internal volume rated less than 200 bar (2,900 psig), and/or have a maximum volume of less than 0.1 liter (Article 3, 1.1.(a) first indent, Group 1 fluids). Therefore, these transmitters are not subject to the essential requirements of the directive 97/23/EC (PED, Annex I) and shall not have the CE mark applied. For transmitters rated > 200 bar (2,900 psig) < 1,000 bar (14,500 psig) Honeywell maintains a technical file in accordance with Annex III, Module A, (internal production control) when the CE mark is required. Transmitter Attachments: Diaphragm Seals, Process Flanges and Manifolds comply with Sound Engineering Practice.
	NOTE: Pressure transmitters that are part of safety equipment for the protection of piping (systems) or vessel(s) from exceeding allowable pressure limits, (equipment with safety functions in accordance with Pressure Equipment Directive 97/23/EC article 1, 2.1.3), require separate examination. A formal statement from TÜV Industry Service Group of TÜV America, Inc., a division of TÜV Süddeutschland, a Notified Body regarding the Pressure Equipment Directive, can be found at www.honeywell.com. A hard copy may be obtained by contacting a Honeywell representative.
CE Mark	***Electro Magnetic Compatibility (EMC) (2004/108/EC)*** All Models: EN 50081-1: 1992; EN 50082-2:1995; EN 61326-1:1997 + A1, A2, and A3 – Industrial Locations
Dual Seal Certification	Dual Seal Certification based on ANSI/NFPA 70-202 and ANSI/ISA 12.27.01 requirements without the use of additional seal protection elements.
Recommended Frequency of Calibration	Honeywell recommends verifying the calibration of these devices once every four years.
Approved Manufacturing Locations	Honeywell Process Solutions - York, PA USA Honeywell (Tianjin) Limited – Tianjin, P.R. China Honeywell Automation India Ltd. – Pune 411013 India

Hastelloy® C-276 is a registered trademark of Haynes International.

Monel 400® is a registered trademark of Special Metals Corporation.

ST 3000® and Experion® are registered trademarks of Honeywell International Inc.

Viton® is a registered trademark of DuPont

Teflon® is a registered trademark of DuPont.

DC® 200 is a registered trademark of Dow Corning.

FM Approvals℠ is a service mark of FM Global

Mounting

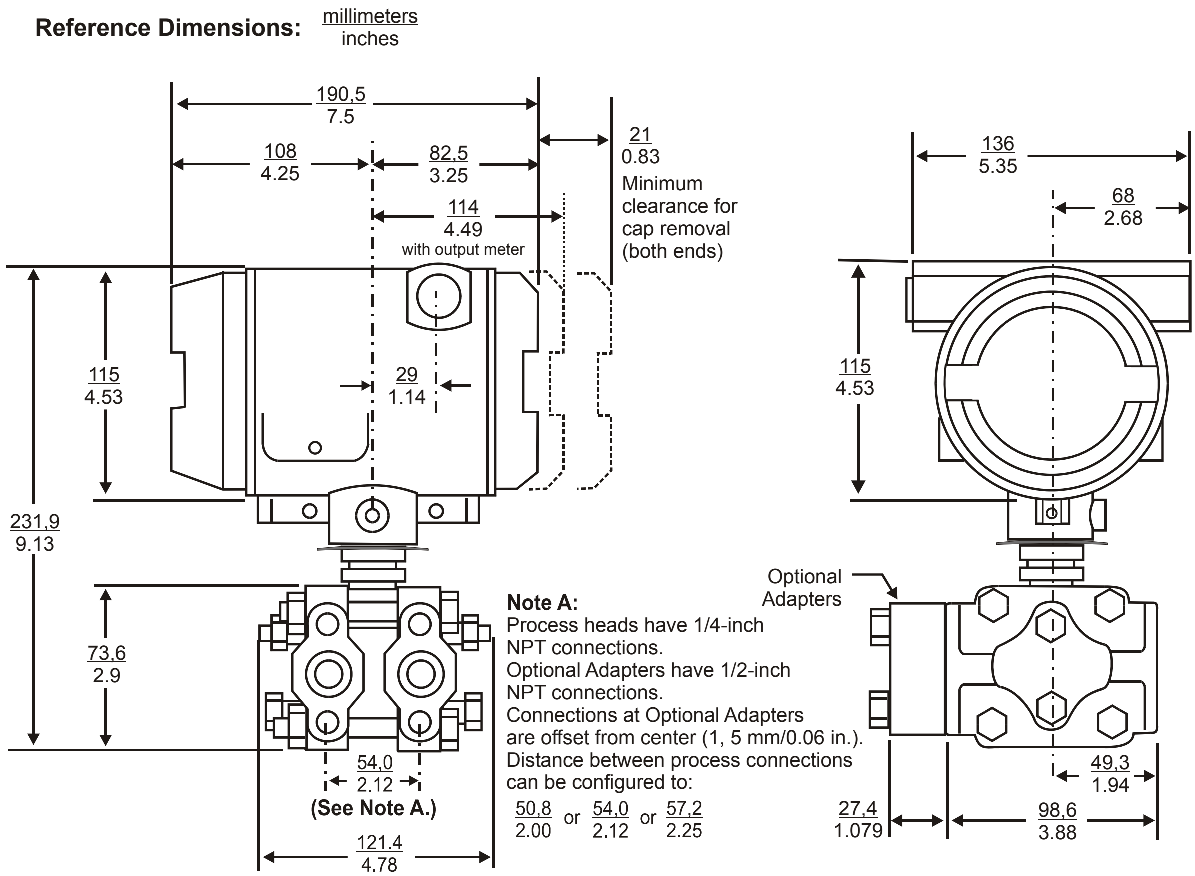

Figure 8 —Approximate Mounting Dimensions for Reference Only.

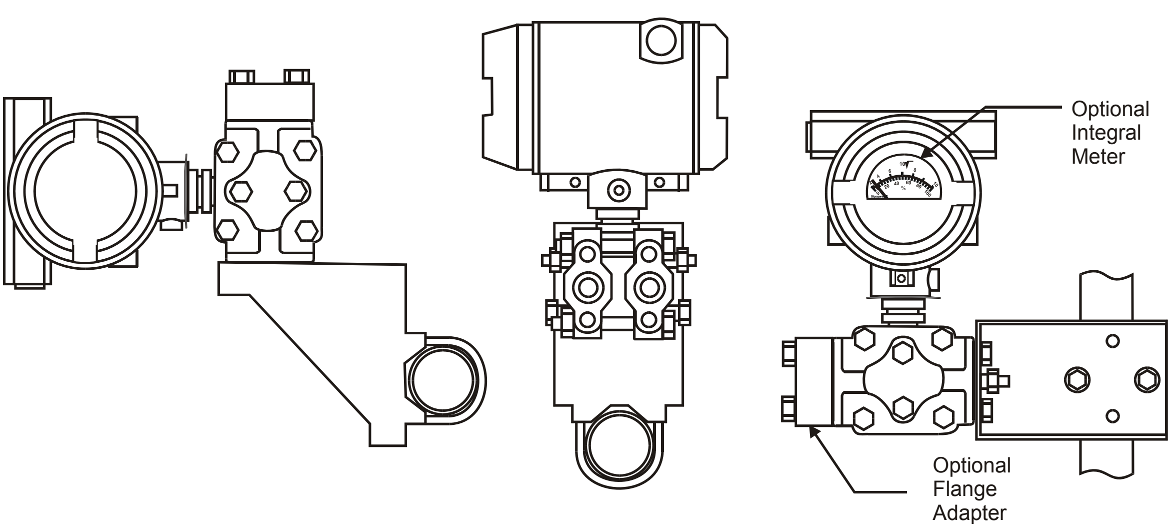

Figure 9 —Examples of Typical Mounting Positions.

Options

- **Angle Mounting Bracket – (Options MB, MX, SB, SX and FB)**

  The angle mounting bracket is available in either carbon steel or stainless steel and is suitable for horizontal or vertical mounting on a two inch (50mm) pipe, as well as wall mounting. An optional flat mounting bracket is also available in carbon steel for 2 inch (50mm) pipe mounting. An option also exists for Marine approved mounting brackets used with the Marine certification options.

- **Indicating Meter – (Options ME and SM)**

  An analog or digital meter is available with 0 to 10 square root or 0 to 100% linear scale.

- **Adapter Flanges - (Options S2, S3, S4, S5, T2, T3, V2, V3)**

  Convert standard 1/4 inch NPT connections to 1/2 inch NPT. Available in Stainless Steel, Hastelloy C and Monel with CS, 316SS, B7M or NACE A286 bolts.

- **Conduit Adapters - (Options A1, A2)**

  Converts standard 1/2 inch NPT Electrical Conduit Entry to M20 or 3/4 inch NPT. Adapters are 316 SS.

- **Write Protection – (Options WP, WX)**

  A jumper on the SMV 3000's main board is activated so that the configuration database, as delivered from the factory, is in "read-only" and cannot be changed with WX. The WP option allows configuration changes when delivered from the factory.

- **Customer Tag - (Option TG)**

  This stainless steel tag connected to the SMV 3000 via wire allows you to specify information - 4 lines with 28 characters per line maximum.

- **Oxygen Cleaned Transmitter - (Option OX)**

  Insures that the SMV 3000 has been cleaned of hydrocarbons so that it can be used in applications such as oxygen and chlorine service.

- **Over-Pressure Leak Test - (Option TP)**

  Certificate confirming that the SMV 3000 has been leak tested to 4,500 psi.

- **Additional Warranty - (Options W1 - W4)**

  Standard warranty for the SMV 3000 is 1 year after delivery. The extended warranty options allow the SMV 3000 to be warranted for up an additional 4 years.

- **Laminar Flow Element - (Option LF)**

  Provides a SMV 3000 transmitter with specific mass flow equations supporting the Meriam Laminar Flow Element for applications such as combustion air.

- **Lightning Protection - (Option LP)**

  A terminal block with circuitry that protects the transmitter from transient surges induced by nearby lightning strikes. This does not provide protection for RTD or thermocouple wiring.

- **Side Vent/Drain - (Option SV)**

  Replaces standard End Vent/Drain plugs with side vent/drain plugs.

- **SS Center Vent/Drain and Bushing - (Option CV)**

  Allows a special bushing on side and end vent-drain plugs.

- **Head Gaskets - (Option VT)**

  Replaces standard PTFE head gaskets with Viton.

- **Custom Calibration - (Option CC)**

  Standard calibration for SMV 3000 includes: 0 - 100 inH_2O for DP, 0 - 125 psia for AP and -328 to 852^{o}F. for a Pt. 100 Ohm RTD input. Custom calibration allows you to have the factory calibrate the SMV 3000 based on your application. The CC - Custom Calibration form must be completed at time of order.

- **Multivariable Tx. Configuration - (Option MC)**

  Allows you to have the SMV 3000 configured at the factory based on your application. Includes range configuration for DP, AP, Temp. and Compensated Flowrate. The MC form must be completed at time of order.

- **NACE Nuts and Bolts - (Option CR)**

  Standard head nuts and bolts for the SMV 3000 are carbon steel. CR option supplies A286SS bolts and 302/304SS nuts for environments that are corrosive to carbon steel. 316SS bolts for adapters supplied when ordered.

- **Calibration Test Report - (Option F1)**

  Provides document stating calibration points for all measured variables.

- **NACE Certificate - (Options F7, FG)**

  Provides documentation verifying that either Process-wetted parts only (FG) or both process-wetted and non-wetted parts (F7) conform to NACE specifications.

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

SMV 3000 Model Selection Guide

Honeywell

34-ST-16U-51
Issue 22
Page 1 of 4

SMV 3000 Smart Multivariable Flow Transmitter

Differential Pressure, Static Pressure, Process Temperature & Flowrate

Model Selection Guide

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

Differential Pressure Range		Pressure Range	Selection	Availability		
0-1" / 25" H$_2$0	0-2.5 to 0-62.5 mbar	0-100 psia (7.0 bara)	SMA110	↓		
0-1" / 400" H$_2$0	0-2.5 to 0-1,000 mbar	0-750 psia (52.5 bara)	SMA125		↓	
0-1" / 400" H$_2$0	0-2.5 to 0-1,000 mbar	0-3,000 psig (210 barg)	SMG170			↓
See 13:STT-21and 13:STT-35 for temperature probes and thermowells ordering information.						

TABLE I - METER BODY

	Process Heads	Vent/Drain Valves and Plugs[2]	Barrier Diaphragms	Selection			
Materials of Construction	Carbon Steel [1]	316 SS	316L SS	A _ _	●	●	●
	Carbon Steel [1]	316 SS	Hastelloy® C-276 [3]	B _ _		●	●
	Carbon Steel [1]	316 SS	Monel 400® [4]	C _ _		●	
	Carbon Steel [1]	316 SS	Tantalum	D _ _		●	
	316 SS [5]	316 SS	316L SS	E _ _	●	●	●
	316 SS [5]	316 SS	Hastelloy® C-276 [3]	F _ _		●	●
	316 SS [5]	316 SS	Monel 400® [4]	G _ _		●	
	316 SS [5]	316 SS	Tantalum	H _ _		●	
	Hastelloy® C-276 [3, 6]	Hastelloy® C-276 [3]	Hastelloy® C-276 [3]	J _ _		●	●
	Hastelloy® C-276 [3, 6]	Hastelloy® C-276 [3]	Tantalum	K _ _		●	
	Monel 400® [4, 7]	Monel 400® [4]	Monel 400® [4]	L _ _		●	
Fill Fluid	DC®200 Silicone			_ 1 _	●	●	●
	CTFE			_ 2 _	●	●	●
Process Head Configuration	1/4" NPT			_ _ A	●	●	●
	1/2" NPT with Adapter (on 1/4" NPT Head)			_ _ H	t	t	t

TABLE II

No Selection	00000	●	●	●

[1] Carbon Steel heads are zinc-plated.
[2] Vent/Drains are sealed with Teflon® [9] or PTFE.
[3] Hastelloy® C-276 or UNS N10276
[4] Monel 400® or UNS N04400
[5] Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.
[6] Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy® C-276
[7] Supplied as indicated or as Grade M30C, the casting equivalent of Monel 400®

SMV 3000 Model Selection Guide (continued)

34-ST-16U-51
Issue 22
Page 2 of 4

TABLE III - OPTIONS

	SMX1xx Selection	Availability 10	25	70	
Indicating Meter Options					
Analog Meter (0-100 Even 0-10 Square Root)	ME	p	p	p	
Smart Meter ** *(0 to 100% digital display only)* **	SM	r	r	r	
Transmitter Housing & Electronics Options					
Lightning Protection	LP	●	●	●	
Custom Calibration and I.D. in Memory	CC	●	●	●	
Multivariable Transmitter Configuration	MC	●	●	●	
Write Protection (Delivered in the "enabled" position)	WP	●	●	●	
Write Protection (Delivered in the "disabled" position)	WX	●	●	●	b
M20 316 SS Conduit Adaptor	A1	n	n	n	b
3/4" NPT 316 SS Conduit Adapter	A2	u	u	u	
Stainless Steel Customer Wired-On Tag (4 lines, 28 characters per line, customer supplied information)	TG	●	●	●	b
Stainless Steel Customer Wired-On Tag (blank)	TB	●	●	●	
Laminar Flow Element Software	LF	●	●		
End Cap Live Circuit Warning Label in Spanish (only with ATEX 3D)	SP	a	a	a	
End Cap Live Circuit Warning Label in Portuguse (only with ATEX 3D)	PG	a	a	a	b
End Cap Live Circuit Warning Label in Italian (only with ATEX 3D)	TL	a	a	a	
End Cap Live Circuit Warning Label in German (only with ATEX 3D)	GE	a	a	a	
Meter Body Options					
316 SS Bolts and 316 SS Nuts for Process Heads	SS	●	●	●	
B7M Bolts and Nuts for Process Heads	B7	●	●	●	b
A286 SS (NACE) Bolts and 304 SS (NACE) Nuts for Heads	CR	●	●	●	
316 SS [5] Adapter Flange - 1/2" NPT with CS Bolts	S2	c	c	c	
316 SS [5] Adapter Flange - 1/2" NPT with 316 SS Bolts	S3	c	c	c	
316 SS [5] Adapter Flange - 1/2" NPT with NACE A286 SS Bolts	S4	c	c	c	
316 SS [5] Adapter Flange - 1/2" NPT with B7M Bolts	S5	c	c	c	
Hastelloy® C-276 [3, 6] Adapter Flange - 1/2" NPT with CS Bolts	T2	c	c	c	b
Hastelloy® C-276 [3, 6] Adapter Flange - 1/2" NPT with 316 SS Bolts	T3	c	c	c	
Monel 400® [4, 7] Adapter Flange - 1/2" NPT with CS Bolts	V2	c	c	c	
Monel 400® [4, 7] Adapter Flange - 1/2" NPT with 316 SS Bolts	V3	c	c	c	
316 SS [5] Blind Adapter Flange with CS Bolts	B3	c	c	c	
316 SS [5] Blind Adapter Flange with 316 SS Bolts	B4	c	c	c	
316 SS [5] Blind Adapter Flange with NACE A286 SS Bolts	B5	c	c	c	b
316 SS [5] Blind Adapter Flange with B7M Bolts	B6	c	c	c	
Side Vent/Drain (End Vent Drain is standard)	SV	●	●	●	
316 SS Center Vent Drain and Bushing	CV	●	●	●	b
Viton® [8] Process Head Gaskets (½" adapter gaskets ordered separately)	VT	●	●	●	
Viton® [8] Adapter Flange Gaskets	VF	17	17	17	
Transmitter Mounting Bracket Options					
Angle Mounting Bracket - Carbon Steel	MB	●	●	●	
Marine Approved Angle Mounting Bracket - Carbon Steel	MX	●	●	●	
Angle Mounting Bracket - 304 SS	SB	●	●	●	b
Marine Approved Angle Mounting Bracket - 304 SS	SX	●	●	●	
Flat Mounting Bracket	FB	●	●	●	
Services/Certificates/Marine Type Approval Options					
User's Manual Paper Copy	UM	●	●	●	
Clean Transmitter for Oxygen or Chlorine Service with Certificate	0X	j	j	j	
Over-Pressure Leak Test with F3392 Certificate	TP	●	●	●	
Calibration Test Report and Certificate of Conformance (F33208)	F1	●	●	●	
Certificate of Conformance (F3391)	F3	●	●	●	b
Certificate of Origin (F0195)	F5	●	●	●	
NACE Certificate (Process-Wetted & Non-Process Wetted) (FC33339)	F7	o	o	o	b
NACE Certificate (Process-Wetted only) (FC33338)	FG	●	●	●	
Material Traceability Certification per EN 10204 3.1 (FC33341)	FX	●	●	●	
Marine Type Approvals (DNV, ABS, BV, KR & LR) (FC33340)	MT	2	2	2	

[3] Hastelloy® C-276 or UNS N10276
[4] Monel 400® or UNS N04400
[5] Supplied as 316 SS or as Grade CF8M, the casting equivalent of 316 SS.
[6] Supplied as indicated or as Grade CW12MW, the casting equivalent of Hastelloy® C-276
[7] Supplied as indicated or as Grade M30C, the casting equivalent of Monel 400®
[8] Viton® or Fluorocarbon Elastomer

SMV 3000 Model Selection Guide (continued)

Issue 22
Page 3 of 4

TABLE III - OPTIONS (continued)

Warranty Options	SMX1xx Selection	Availability 10	25	70	
Additional Warranty - 1 year	W1	•	•	•	b
Additional Warranty - 2 years	W2	•	•	•	b
Additional Warranty - 3 years	W3	•	•	•	b
Additional Warranty - 4 years	W4	•	•	•	b

TABLE III - OPTIONS (continued)

Approval Body	Approval Type	Location or Classification	Selection	10	25	70	
None	None		9X	•	•	•	b
FM Approvals℠	Explosion Proof	Class I, Div. 1, Groups A,B,C,D	1C	•	•	•	b
	Dust Ignition Proof	Class II, Div. 1, Groups E,F,G					
	Suitable for use in	Class III, Div. 1					
	Non-Incendive	Class I, Div. 2, Groups A,B,C,D					
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G - - T4 at Ta $\leq$ 93°C					
Canadian Standards Association (CSA)	Explosion Proof	Class I, Div. 1, Groups B,C,D	2J	•	•	•	b
	Dust Ignition Proof	Class II, III, Div. 1, Groups E,F,G					
	Suitable for use in	Class I, II, III, Div. 2, Groups A,B,C,D,E,F,G					
	Intrinsically Safe	Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G - T4 at Ta $\leq$ 93°C					
IECEx	Flameproof, Zone 1	Ex d IIC; T5 (Ta = -40 to +93ºC), T6 (Ta = -40 to +78ºC)	CA	•	•	•	b
	Intrinsically Safe, Zone 0/1	Ex ia IIC; T3, T4, T5 , T6. See Spec for detailed temperature codes by Communications option.					
ATEX[10] (LCIE)	Intrinsically Safe Zone 0/1	Ex II 1 G Ex ia IIC T5	3S	•	•	•	b
	Flameproof, Zone 1	Ex II 2 G Ex d IIC T6, Enclosure IP 66/67	3D	•	•	•	b
	Non-Sparking Zone 2	Ex II 3 G Ex nA, IIC T6 Vmax = 42 Vdc T4 at Ta = 93°C T5 at Ta = 80°C T6 at Ta = 65°C (Honeywell). Enclosure IP 66/67	3N	•	•	•	b
	Multiple Marking[11] Int. Safe, Zone 0/1, or Flameproof, Zone 1, or Non-Sparking, Zone 2	Ex II 1 G Ex ia IIC T4, T5, T6 Ex II 2 G Ex d IIC T5, T6 Ex II 3 G Ex nA, IIC T6 (Honeywell) Enclosure IP 66/67	3H	•	•	•	b
SAEx (South Africa)	Intrinsically Safe, Zone 0/1	Ex ia IIC T4, T5, T6	Z2	•	•	•	b
	Flameproof, Zone 1	EX d IIC T5, T6 Enclosure IP 66/67	ZD	•	•	•	b
	Multiple Marking[11] Int. Safe, Zone 0/1, or Flameproof, Zone 1	Ex ia IIC T4, T5, T6 Ex d IIC T5, T6 Enclosure IP 66/67	ZA	•	•	•	b

[10] See ATEX installation requirements in the ST 3000 User's Manual
[11] The user must determine the type of protection required for installation of the equipment. The user shall then check the box [√] adjacent to the type of protection used on the equipment certification nameplate. Once a type of protection has been checked on the nameplate, subsequently the equipment shall not be reinstalled using any of the other certification types.

SMV 3000 Model Selection Guide (continued)

34-ST-16U-51
Issue 22
Page 4 of 4

TABLE IV

Factory Identification	XXXX	•	•	•

RESTRICTIONS

Restriction Letter	Available Only With		Not Available With	
	Table	Selection	Table	Selection
a	III	3D or 3H		
b	Select only one option from this group.			
c	I	_ _ H		
j	I	_ 2 _		
n			III	1C, 2J
o	III	CR, S4 or B5		
p			III	Functions in the analog mode only.
r	III	Display is 0-100% only. No other smart functions available with this option.		
t	III	S2, T2 or V2		
u	III	1C, 2J		
2	III	MX, SX	III	FB, MB, SB
17	III	VT		

Ordering Example: SMA125-E1A-00000-MB,MC,1C + XXXX

Hastelloy® is a registered trademark of Haynes International
Monel 400® is a registered trademark of Special Metals Corporation.
HART® is a registered trademark of HART Communication Foundation.
FOUNDATION™ Fieldbus is a registered trademark of Fieldbus Foundation.
Viton® is a registered trademark of DuPont Performance Elastomers.
FM Approvals℠ is a service mark of FM Global
DC® 200 is a registered trademark of Dow Corning
Teflon® is a registered trademark of DuPont.

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.

ASIA PACIFIC

Control Products
Asia Pacific Headquarters
Phone: +(65) 6355-2828
Fax: +(65) 6445-3033

Asia Pacific Global Technical Support

Field Instruments
Phone: +65 6580 3156
Fax: +65 6445-3033
Process Instruments
Phone: (603) 76950 4777
Fax: (603) 7958 8922

Australia
Honeywell Limited
Phone: +(61) 7-3846 1255
FAX: +(61) 7-3840 6481
Toll Free 1300-36-39-36
Toll Free Fax:
1300-36-04-70

China – PRC - Beijing
Honeywell China Inc.
Phone: +(86-10) 8458-3280
Fax: +(86-10) 8458-4650

China – PRC - Shanghai
Honeywell China Inc.
Phone: (86-21) 5257-4568
Fax: (86-21) 6237-2826

China – PRC - Chengdu
Honeywell China Inc.
Phone: +(86-28) 8678-6348
Fax: +(86-28) 8678-7061

China – PRC - Xi'an
Honeywell China Ltd - Xi'an.
Phone: +(86-29) 8833-7490
Fax: +(86-29) 8833-7489

China – PRC - Shenzhen-
Honeywell China Inc.
Phone: +(86) 755-2518-1226
Fax: +(86) 755-2518-1221

Indonesia
PT Honeywell Indonesia
Phone: +(62) 21-535-8833
FAX: +(62) 21-5367 1008

India
Automation India Ltd.
Honeywell Ltd.
Phone:+(91) 5603-9400
Fax: +(91) 5603-9600

Japan
Honeywell Inc.
Phone: +(81) 3 6730 7150
Fax: +(81) 3 6730 7228

Malaysia
Honeywell Engineering
Sdn Bhd
Phone: +(60-3) 7950-4776
Fax: +(60-3) 7958-8922

New Zealand
Honeywell Limited
Phone: +(64-9) 623-5052
Fax: +(64-9) 623-5060
Toll Free (0800) 202-088

Philippines
Honeywell Systems
(Philippines) Inc.
Phone: +(63-2) 633-2830-31/
636 1661-62
Fax: +(63-2) 638-4013

Singapore
Honeywell Pte Ltd.
Phone: +(65) 6580 3278
Fax: +(65) 6445-3033

South Korea
Honeywell Korea Co Ltd
Phone: +(822) 799 6315
Fax: +(822) 792 9015

Thailand
Honeywell Systems
(Thailand) Ltd.
Phone: +(662) 693-3099
FAX: +(662) 693-3089

Taiwan R.O.C.
Honeywell Taiwan Ltd.
Phone: +(886-2) 2245-1000
FAX: +(886-2) 2245-3241

SE Asia Countries

see Honeywell Pte Ltd
(Singapore)
for:
Pakistan
Cambodia
Guam
Laos
Myanmar
Vietnam
East Timor

SE Asia Countries

see Honeywell Automation
India Ltd for:
Bangladesh
Nepal
Sri Lanka

EUROPE

Austria
Honeywell Austria GmbH
Phone: +43 (316)400123
FAX: +43 (316)40017

Belgium
Honeywell SA/NV
Phone: +32 (0) 2 728 24 07
FAX: +32 (0) 2 728 22 45

Bulgaria
Honeywell EOOD
Phone: +(359) 2 40 20 900
FAX: +(359) 2 40 20 990

Czech Republic
Honeywell spol. s.r.o.
Phone: +420 242 442 232
FAX: +420 242 442 131

Denmark
Honeywell A/S
Phone: +(45) 39 55 55 55
FAX: +(45) 39 55 55 58

Finland
Honeywell OY
Phone: +358 (0) 20752 2753
FAX: +358 (0) 20752 2751

France
Honeywell SA
Phone: +33 (0)1 60198075
FAX: +33 (0)1 60198201

Germany
Honeywell AG
Phone: +49 (69)8064-299
FAX: +49 (69)806497336

Hungary
Honeywell Kft.
Phone: +36-1-451 4300
FAX: +36-1-451 4343

Italy
Honeywell S.p.A.
Phone: +39 02 92146 307/
395
FAX: +39 0292146377

The Netherlands
Honeywell B.V.
Phone: +31 (0) 20 5656200
FAX: +31 (0) 20 5656210

Norway
Honeywell A/S
Phone: (45) 39 55 55 55

Poland
Honeywell Sp. zo.o
Phone: +48-22-6060900
FAX: +48-22-6060901

Portugal
Honeywell Portugal Lda
Phone: +351 21 424 5000
FAX: +351 21 424 50 99

Romania
Honeywell Bucharest
Phone: +40 (0) 21 2316437
FAX: +40 (0) 21 2316439

Russian Federation (RF),
ZAO "Honeywell"
Phone: +7 (095) 796 98 00
FAX: +7 (495) 797 99 64

Slovak Republic
Honeywell s.r.o.
Phone: +421-2-58247 410
FAX: +421-2-58247 415

Spain
Honeywell S.A.
Phone: +34 (0)91313 61 00
FAX: +34 (0)91313 61 30

Sweden
Honeywell AB
Phone: +(46) 8 775 55 00
FAX: +(46) 8 775 56 00

Switzerland
Honeywell AG
Phone: +41 18552448
FAX: +(41) 1 855 24 45

Turkey
Honeywell Turkey A.S.
Phone: +90 216 578 71 00
FAX: +90 216 575 66 35

Ukraine
Honeywell
Tel: +380-44-201 44 74
Fax: +380-44-201-44-75

United Kingdom
Honeywell Control Systems
Ltd.
Phone: +44 (0)1344 655251
FAX: +44 (0) 1344 655554

MIDDLE EAST

Abu Dhabi U A E
Middle East Headquarters
Honeywell Middle East Ltd.
Phone: +971 2 4041246
FAX: +971 2 4432536

Sultanate of Oman
Honeywell & Co Oman LLC
Phone: +968 24 701153/
Ext.33
FAX +968 24 787351

Saudia Arabia
Honeywell Turki Arabia Ltd
Jubail Office
Phone: +966-3-341-0140
Fax: +966-3-341-0216
Honeywell - ATCO
Dammam Office
Phone: 0096638304584
Fax: 0096638338059

Kuwait
Honeywell Kuwait KSC
Phone: +965 242 1327 to 30
Fax: +965 242 8315
and
Phone: +965 326 2934/1821
Fax: +965 326 1714

AFRICA

Mediterranean & African Distributors
Honeywell SpA
Phone: +39 (02) 250 10 604
FAX: +39 (02) 250 10 659

South Africa (Republic of) and sub saharan
Honeywell Southern Africa
Honeywell S.A. Pty. Ltd.
Phone: +27 11 6958000
FAX +27 118051504

NORTH AMERICA

Canada
Honeywell LTD
Phone: 1-800-737-3360
FAX: 1-800-565-4130

USA
Honeywell Process Solutions,
Phone: 1-800-423-9883
Or 1-800-343-0228
Email: ask-ssc@honeywell.com

SOUTH AMERICA

Argentina
Honeywell S.A.I.C.
Phone: +(54-11) 4383-3637
FAX: +(54-11) 4325-6470

Brazil
Honeywell do Brasil & Cia
Phone: +(55-11) 7266-1900
FAX: +(55-11) 7266-1905

Chile
Honeywell Chile, S.A.
Phone: +(56-2) 233-0688
FAX: +(56-2) 231-6679

Mexico
Honeywell S.A. de C.V.
Phone: +(52) 55 5259-1966
FAX: +(52) 55 5570-2985

Puerto Rico
Honeywell Inc.
Phone: +(809) 792-7075
FAX: +(809) 792-0053

Trinidad
Honeywell Inc.
Phone: +(868) 624-3964
FAX: +(868) 624-3969

Venezuela
Honeywell CA
Phone: +(58-2) 238-0211
FAX: +(58-2) 238-3391

Specifications are subject to change without notice.

For More Information

Learn more about how Honeywell's SMV 3000 Smart Multivariable Flow Transmitter can increase performance, reduce downtime and decrease configuration costs, visit our website www.honeywell.com/ps or contact your Honeywell account manager.

Honeywell Process Solutions
1860 West Rose Garden Lane
512 Virginia Drive
Tel: 1-800-423-9883 or 1-800-343-0228
www.honeywell.com/ps

34-SM-03-01
August 2010
© 2010 Honeywell International Inc.