Honeywell

SMV 3000 Smart Multivariable Flow Transmitter

Specification and Model Selection Guide

Measurements and Calculations:

- Differential Pressure
- Absolute or Gauge Pressure
- Process Temperature via 100 ohm Pt. RTD or Type J,K,T or E Thermocouple
- Mass or Volumetric Flow Rate of Air, Gases, Steam or Liquids

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 one 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.

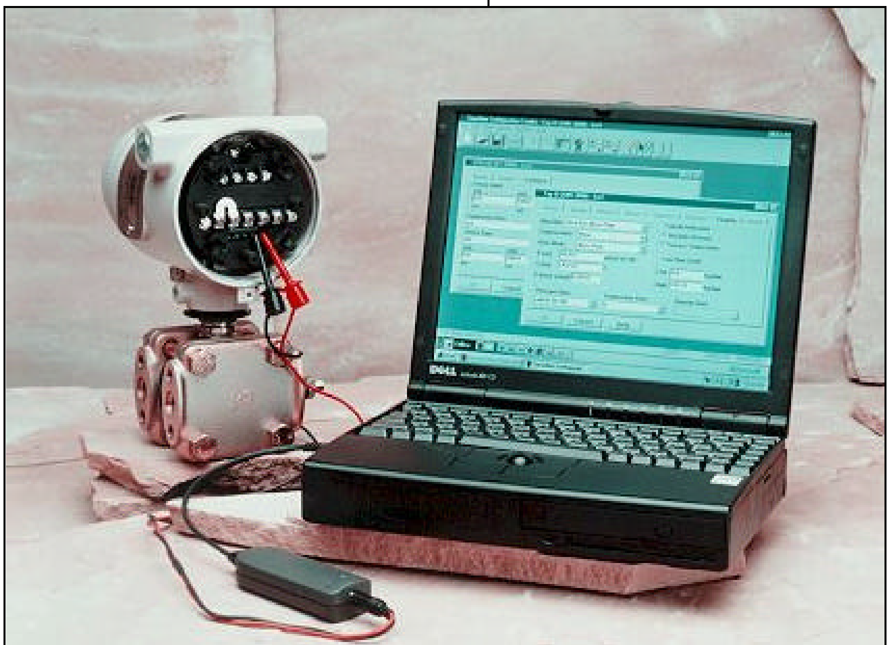

Figure 1 —SMV 3000 Smart Multivariable Flow Transmitter with SCT 3000 Smart Configuration Toolkit. The SMV 3000 measures differential pressure, static pressure and process temperature, and dynamically calculates mass or volumetric flow rate based on these measurements.

SCT 3000 ordered separately under Specification 34-CT-03-02

- Standard compensation supports other primary flow elements:
  - Venturi
  - Nozzle
  - Averaging Pitot Tube
- Digital integration with our TotalPlant® Solutions (TPS) system provides local measurement accuracy to the system level without adding typical A/D and D/A converter errors.

TotalPlant® is a registered trademark of Honeywell Inc.

SMV 3000 Sensor and Flow Transmitter Functions

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.

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. See pages 22 and 23.

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,

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

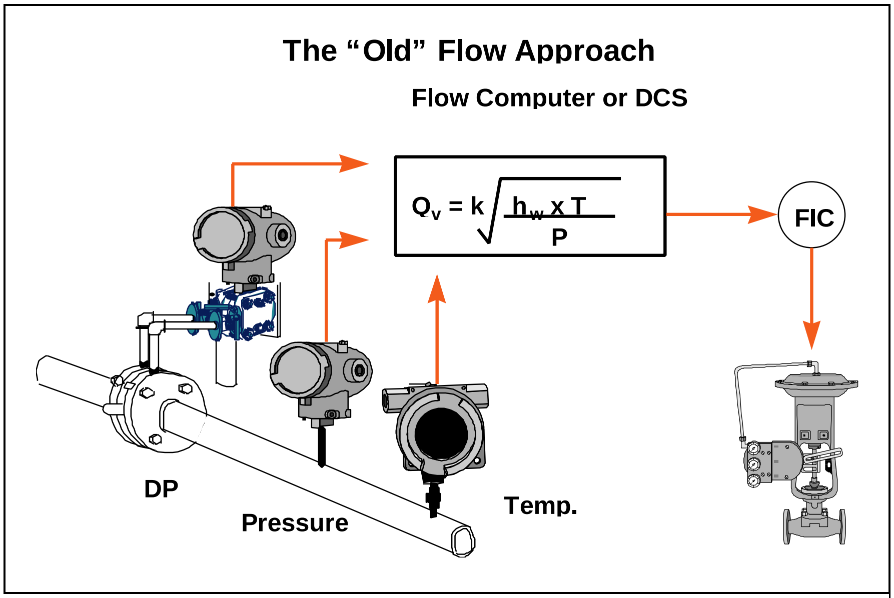

Figure 2 —Flow Compensation Using the "Old" Approach

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:

$$k = NCE_vY_1d^2$$

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 effect 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.

Description of Flow Variables for Dynamic Flow Compensation

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: (*next page* ⇒)

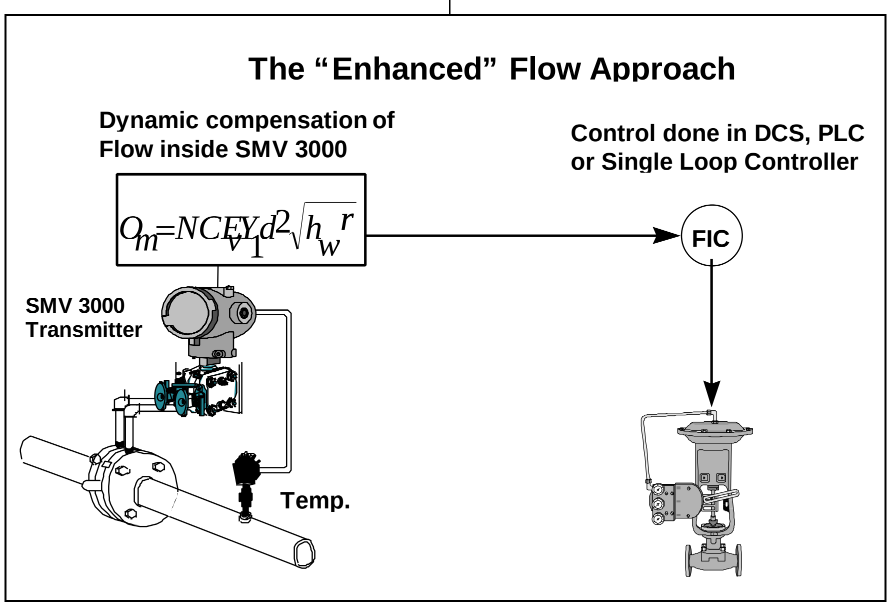

Figure 3 —Flow Compensation Using the "Enhanced" Approach

$$Re = \frac{vDr}{u}$$

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:

$$\mu = v_1 + v_2T_F + v_3T_F^2 + v_4T_F^3 + v_5T_F^4$$

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:

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

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:

$$Q_m = Q_v \bullet \rho$$

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.

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 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.

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. You connect the SFC or SCT anywhere that you can access the transmitter signal lines. Communicators provide the capabilities of transmitter adjustments and diagnostics from remote locations, such as the control room. The SFC and SCT support other Smartline Instruments too: ST 3000, STT 3000 and MagneW *Plus*.

Smart Field Communicator

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 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.

Smart Technology Delivers Broad Benefits and Reduces Total Cost of Ownership

The SMV 3000 combines integrated sensor and microprocessor technologies as well as dynamic flow compensation to produce the most accurate and consistent 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:

- ***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.

Digital Integration Links the SMV 3000 to 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 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 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 and MagneW 3000 *Plus* Smart Flowmeter. 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, 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.

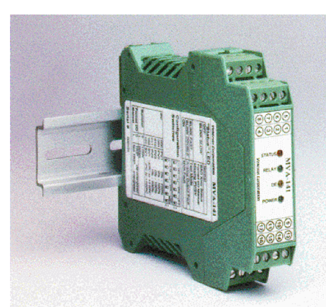

Figure 6 —MultiVariable Analog Interface

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

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 * –40 to 230 *	–40 to 125 * –40 to 257 *	–55 to 125 –67 to 257
Humidity	**%RH**	10 to 55	0 to 100	0 to 100	0 to 100
Overpressure	**psi** **bar**	0 0	3000 ** 210	3000 ** 210	
Vacuum Region - Minimum Pressure	**mmHg absolute** **inH$_2$O absolute**	Atmospheric Atmospheric	25 13	2 (short term†) 1 (short term†)	
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).			

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

** 100 psi (7 bar) for Model SMA110

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

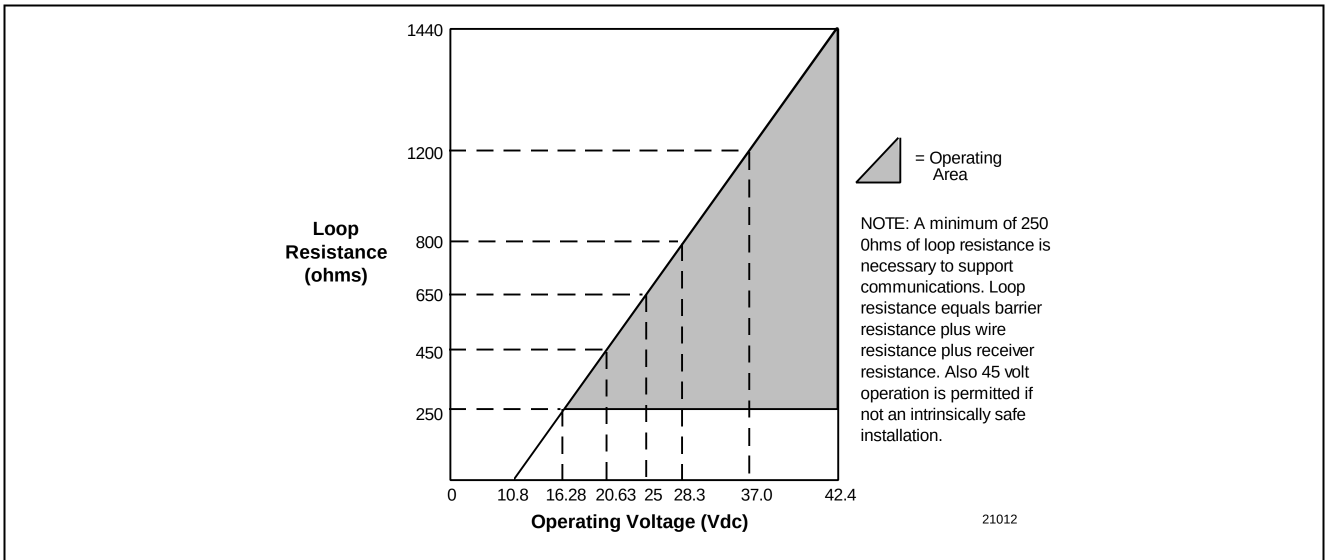

Figure 7 —Supply Voltage and Loop Resistance Chart.

SMV 3000 Specifications, continued

Performance Under Rated Conditions - 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: $\pm 0.025 \pm 0.1 \left(\frac{10 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.025 \pm 0.1 \left(\frac{25 \text{ mbar}}{\text{span mbar}}\right)$ in % 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: $\pm 0.1 \left(\frac{10 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.1 \left(\frac{25 \text{ mbar}}{\text{span mbar}}\right)$ in % 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: $\pm 0.025 \pm 0.50 \left(\frac{10 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.025 \pm 0.50 \left(\frac{25 \text{ mbar}}{\text{span mbar}}\right)$ in % span ***In Digital Mode:*** ±0.5% of calibrated span. For URV below reference point (10 inH_2O), effect equals: $\pm 0.50 \left(\frac{10 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.50 \left(\frac{25 \text{ mbar}}{\text{span mbar}}\right)$ in % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.15% of calibrated span. ***In Digital Mode:*** ±0.125% of calibrated span.
Drift (At Reference Conditions)	TBD
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

SMV 3000 Specifications, continued

Performance Under Rated Conditions - 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 to 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: $\pm 0.025 \pm 0.075 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.025 \pm 0.075 \left(\frac{62 \text{ mbar}}{\text{span mbar}}\right)$ in % 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: $\pm 0.0125 \pm 0.0625 \left(\frac{25 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.0125 \pm 0.0625 \left(\frac{62 \text{ mbar}}{\text{span mbar}}\right)$ in % 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: $\pm 0.0125 \pm 0.10 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.0125 \pm 0.10 \left(\frac{125 \text{ mbar}}{\text{span mbar}}\right)$ in % span ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm 0.10 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.10 \left(\frac{125 \text{ mbar}}{\text{span mbar}}\right)$ in % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1375% of calibrated span. ***In Digital Mode:*** ±0.125% of calibrated span.
Zero Static Pressure Effect per 250 psi (17 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.06% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm 0.0125 \pm 0.0475 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.0125 \pm 0.0475 \left(\frac{125 \text{ mbar}}{\text{span mbar}}\right)$ in % span.
Span Static Pressure Effect per 250 psi (17 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.20% of calibrated span.
Drift (At Reference Conditions)	±0.0625% of URL per year.
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

SMV 3000 Specifications, continued

Performance Under Rated Conditions - 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.
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: $\pm 0.025 \pm 0.075 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.025 \pm 0.075 \left(\frac{125 \text{ mbar}}{\text{span mbar}}\right)$ in % 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: $\pm 0.0125 \pm 0.0625 \left(\frac{50 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.0125 \pm 0.0625 \left(\frac{125 \text{ mbar}}{\text{span mbar}}\right)$ in % 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 (100 inH_2O), effect equals: $\pm 0.0125 \pm 0.10 \left(\frac{100 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.0125 \pm 0.10 \left(\frac{250 \text{ mbar}}{\text{span mbar}}\right)$ in % span. ***In Digital Mode:*** ±0.10% of calibrated span. For URV below reference point (50 inH_2O), effect equals: $\pm 0.10 \left(\frac{100 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.10 \left(\frac{250 \text{ mbar}}{\text{span mbar}}\right)$ in % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.225% of calibrated span. ***In Digital Mode:*** ±0.2% of calibrated span.
Zero Static Pressure Effect per 1000 psi (68 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.125% of calibrated span. For URV below reference point (100 inH_2O), effect equals: $\pm 0.025 \pm 0.125 \left(\frac{100 \text{ inH}_2\text{O}}{\text{span inH}_2\text{O}}\right)$ or $\pm 0.025 \pm 0.125 \left(\frac{250 \text{ mbar}}{\text{span mbar}}\right)$ in % span.
Span Static Pressure Effect per 1000 psi (68 bar) • *Applies for model with Stainless Steel barrier diaphragms*	±0.2% of calibrated span.
Drift (At Reference Conditions)	±0.0625% of URL per year.
Damping Time Constant	Adjustable for 0 to 32 seconds digital damping.

SMV 3000 Specifications, continued

Performance Under Rated Conditions - 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: $\pm 0.025 \pm 0.075 \left(\frac{20\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.025 \pm 0.075 \left(\frac{1.4\text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.0125 \pm 0.0625 \left(\frac{20\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.0125 \pm 0.0625 \left(\frac{1.4\text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.025 \pm 0.10 \left(\frac{50\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.025 \pm 0.10 \left(\frac{3.5\text{ bar}}{\text{span bar}}\right)$ in % 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 % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1375% of calibrated span. ***In Digital Mode:*** ±0.125% of calibrated span.
Drift (At Reference Conditions)	±0.0042% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

Performance Under Rated Conditions - Absolute Pressure Measurement - SMA125

Parameter	Description
Upper Range Limit (URL)	750 psia (52 bara)
Turndown Ratio	50 to 1
Minimum Span	15 psia (1.04 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: $\pm 0.025 \pm 0.075 \left(\frac{20 \text{ psi}}{\text{span psi}}\right)$ or $\pm 0.025 \pm 0.075 \left(\frac{1.4 \text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.0125 \pm 0.0625 \left(\frac{20 \text{ psi}}{\text{span psi}}\right)$ or $\pm 0.0125 \pm 0.0625 \left(\frac{1.4 \text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.0125 \pm 0.10 \left(\frac{50 \text{ psi}}{\text{span psi}}\right)$ or $\pm 0.0125 \pm 0.10 \left(\frac{3.5 \text{ bar}}{\text{span bar}}\right)$ in % 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 % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1375% of calibrated span. ***In Digital Mode:*** ±0.125% of calibrated span.
Drift (At Reference Conditions)	±0.016% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

Performance Under Rated Conditions - Gauge Pressure Measurement - SMG170

Parameter	Description
Upper Range Limit (URL)	3000 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: $\pm 0.025 \pm 0.075 \left(\frac{300\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.025 \pm 0.075 \left(\frac{21\text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.0125 \pm 0.0625 \left(\frac{300\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.0125 \pm 0.0625 \left(\frac{21\text{ bar}}{\text{span bar}}\right)$ in % 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: $\pm 0.0125 \pm 0.10 \left(\frac{300\text{ psi}}{\text{span psi}}\right)$ or $\pm 0.0125 \pm 0.10 \left(\frac{21\text{ bar}}{\text{span bar}}\right)$ in % 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 % span.
Span Temperature Effect per 28°C (50°F) • *Applies for model with Stainless Steel barrier diaphragms*	***In Analog Mode:*** ±0.1375% of calibrated span. ***In Digital Mode:*** ±0.125% of calibrated span.
Drift (At Reference Conditions)	±0.0042% of URL per year.
Damping Time Constant	Adjustable from 0 to 32 seconds digital damping.

Performance Under Rated Conditions - Process Temperature Measurement

Probe Type	Digital Accuracy (Ref.)*		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 1000	32 to 1832	–200 to 1000	–328 to 1832	IEC584.1
J	±1.0	±1.8	0 to 1200	32 to 2192	–200 to 1200	–328 to 2192	IEC584.1
K	±1.0	±1.8	–100 to 1250	–148 to 2282	–200 to 1370	–328 to 2498	IEC584.1
T	±1.0	±1.8	–100 to 400	–148 to 752	–250 to 400	–418 to 752	IEC584.1

*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.

SMV 3000 Specifications, continued

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% span per volt.
CE Conformity (Europe)	89/336/EEC, Electromagnetic Compatibility (EMC) Directive.

Physical

Parameter	Description
Process Interface Material	***Process Barrier Diaphragms:*** 316L SS, Hastelloy C-276, Monel, Tantalum ***Process Head:*** 316 SS, Carbon Steel, Monel, Hastelloy. ***Head Gaskets:*** Teflon, Viton. ***Bolting:*** Carbon Steel, A286 SS (NACE).
Mounting Bracket	Carbon Steel (Zinc-plated) available in angle or flat style.
Fill Fluid	Silicone oil or CTFE (Chlorotrifluoroethylene).
Electronic Housing	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	7 Kg (15.4 lb)
Mounting	See Figure 9.
Hazardous Conditions	Designed to meet requirements of explosion proof and intrinsically safe systems for North America classifications Class I, Groups A, B, C, D, Division I (explosionproof systems Groups B, C, and D only) European (CENELEC) EEx, ia, IIC, T5, Zone 2.

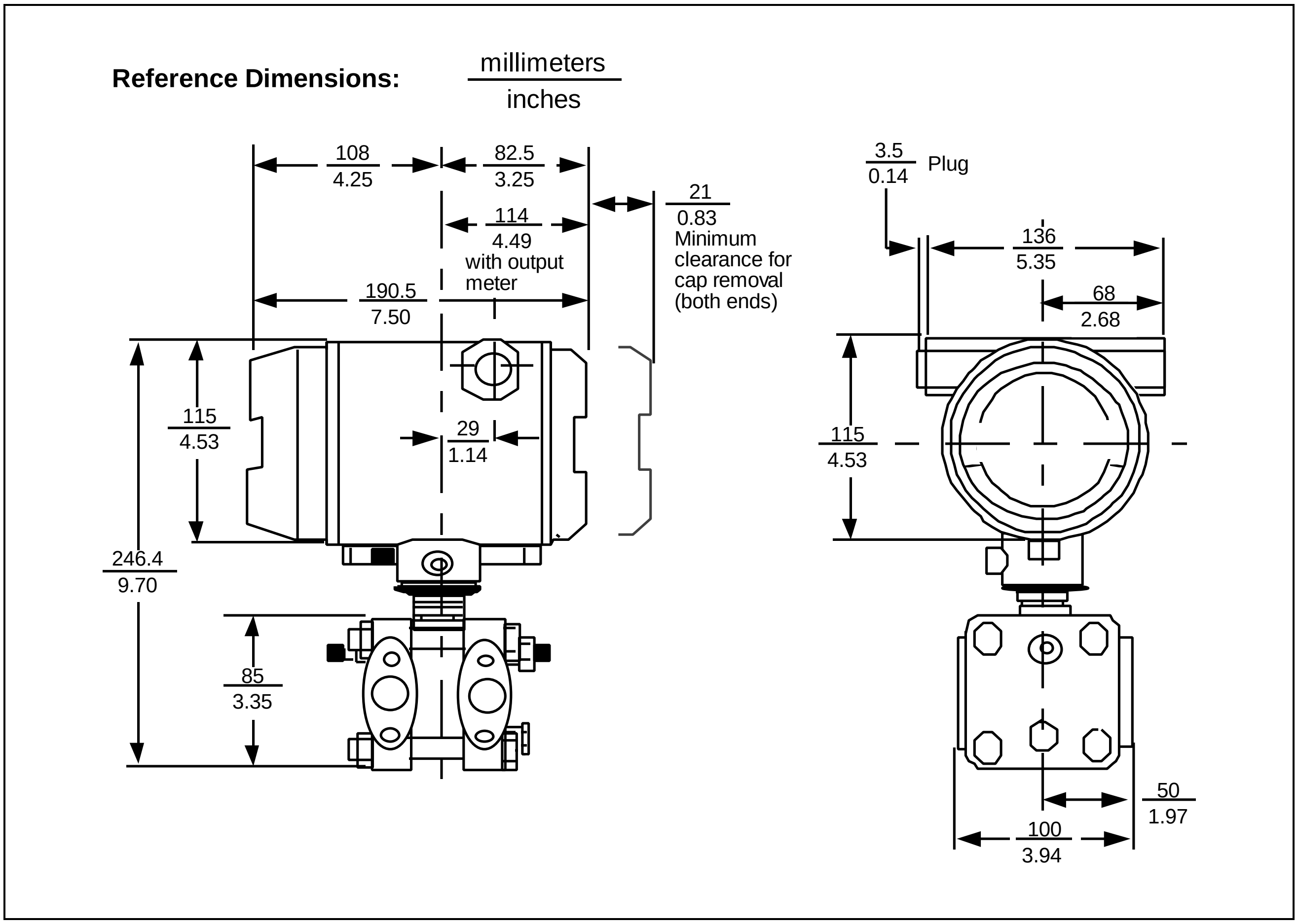

Figure 8 —Approximate Mounting Dimensions for Reference Only.

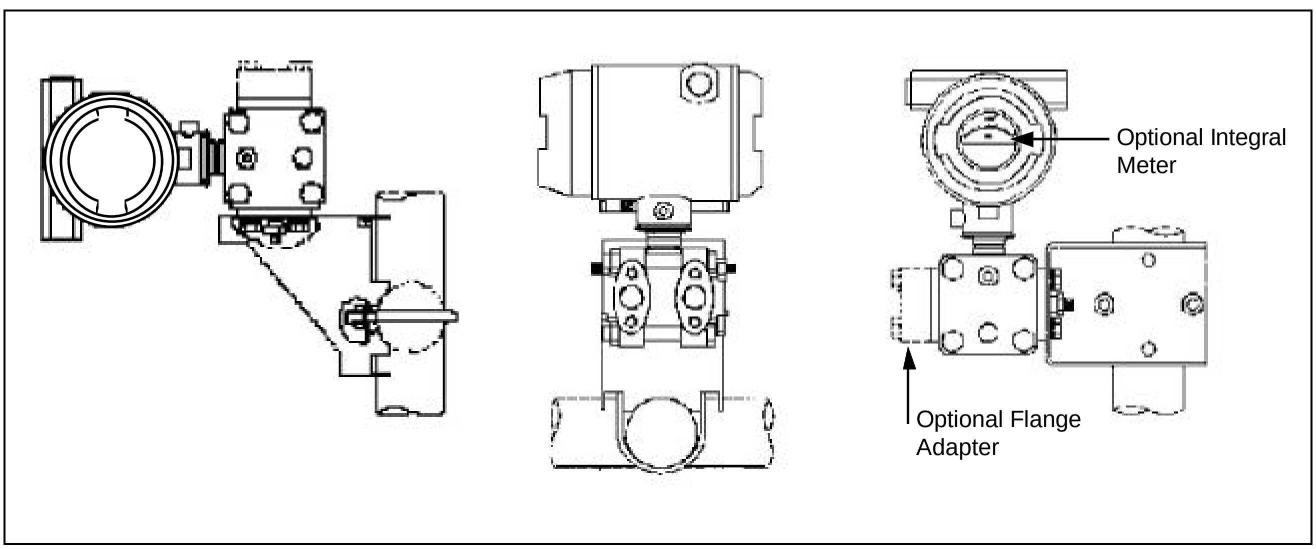

Figure 9 —Examples of Typical Mounting Positions.

SMV 3000 Options

The **SMV 3000** Smart Multivariable Flow Transmitter is available with a variety of options, including:

Mounting Bracket - MB, SB, FB

Available in angle or flat style suitable either for horizontal or vertical mounting on a two-inch pipe or for wall mounting.

Indicating Meter - ME

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

Adapter Flanges - S2, T2, V2

Convert standard 1/4 inch NPT connections to 1/2 inch NPT. Available in Stainless Steel, Hastelloy C and Monel.

Conduit Adapters - A1, A2

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

Head Gaskets - VT

Replaces standard PTFE head gaskets with Viton.

Write Protection - WP

A jumper on the SMV 3000's main board is activated so that the configuration database in read-only and can not be changed.

Customer Tag - 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.

Clean Transmitter - 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 - TP

Certificate confirming that the SMV 3000 has been leak tested to 4500 psi.

Additional Warranty - 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 - 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 - 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 - SV

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

Custom Calibration - CC

Standard calibration for SMV 3000 includes: 0 - 100 inches H_2O for DP, 0 - 125 psia for AP and -328 to 852 degrees. 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 – 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 - 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 also.

SS Center Vent/Drain and Bushing - CV

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

Blind DIN SS Flanges - B2

The blind flange option removes all side or end vents/drains from the process flanges. Used when customer will vent or drain from manifold.

Calibration Test Report - F1

Provides document stating calibration points for all measured variables.

Certificate of Conformance - F3

Provides document stating that the SMV 3000 conforms to all Honeywell quality practices.

Certificate of Origin - F5

Provides document stating that all parts originated here.

Modified DIN Process Heads - DN

Replaces standard heads with modified heads.

NACE Certificate - F7

Provides document stating that specified wetted parts conform to NACE specifications.

SMV 3000 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		
0-0.5" / 25" H20	0-2.5 to 0-62.5 mbar	0-100 psia (7.0 bara)	SMA110	↓		
0-1" / 400" H20	0-2.5 to 0-1000 mbar	0-750 psia (52.5 bara)	SMA125		↓	
0-1" / 400" H20	0-2.5 to 0-1000 mbar	0-3,000 psig (210 barg)	SMG170			↓
See 13:TP-3, 4 and 8 for temperature probes.						
See 13:TP-9 through 12 for thermowells.						

TABLE I - METER BODY

	Process Heads	Vent/Drain Valves and Plugs	Barrier Diaphragms				
Material of Construction	Carbon Steel *	316 St. St.	316 LSS	A _ _	•	•	•
	Carbon Steel *	316 St. St.	Hastelloy C	B _ _		•	•
	Carbon Steel *	316 St. St.	Monel	C _ _		•	
	Carbon Steel *	316 St. St.	Tantalum	D _ _		•	
	316 St. St.	316 St. St.	316 LSS	E _ _	•	•	•
	316 St. St.	316 St. St.	Hastelloy C	F _ _		•	•
	316 St. St.	316 St. St.	Monel	G _ _		•	
	316 St. St.	316 St. St.	Tantalum	H _ _		•	
	Hastelloy C	Hastelloy C	Hastelloy C	J _ _		v	v
	Hastelloy C	Hastelloy C	Tantalum	K _ _		v	
	Monel	Monel	Monel	L _ _		v	
Fill Fluid	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

* Carbon Steel heads are zinc-plated.

TABLE II

No Selection	00000	•	•	•

Model Selection Guide, continued

TABLE III - OPTIONS	STX1XX Selection	Availability 10	25	70	
None	00	•	•	•	
Adapter Flange - 1/2" NPT St. Steel	S2	c	c	c	b
Adapter Flange - 1/2" NPT Hastelloy-C	T2		c	c	b
Adapter Flange - 1/2" NPT Monel	V2		c		b
Modified DIN Process Heads - 316SS	DN	w	w	w	
M20 316 SS Conduit Adaptor	A1	n	n	n	b
3/4" NPT 316 SS Conduit Adapter	A2	u	u	u	b
Viton Head Gaskets (1/2" adapter gaskets are special)	VT	•	•	z	
Mounting Bracket - Carbon Steel	MB	•	•	•	b
Mounting Bracket - ST. ST.	SB	•	•	•	b
Flat Mounting Bracket	FB	•	•	•	b
Lightning Protection	LP	•	•	•	
Analog Meter (0-100 Even 0-10 Square Root)	ME	•	•	•	b
Smart Meter	SM	p	p	p	b
A286SS (NACE) Bolts and 302/304SS (NACE) Nuts for Heads and 316SS (NACE) Bolts for Adapters	CR	•	•	•	
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	•	•	•	b
Side Vent/Drain (End Vent Drain is standard)	SV	y	y	y	
Custom Calibration and I.D. in Memory	CC	•	•	•	
Multivariable Transmitter Configuration	MC	•	•	•	
Write Protection	WP	•	•	•	
Clean Transmitter for Oxygen or Chlorine Service with Certificate	0X	j	j	j	
Over-Pressure Leak Test with F3392 Certificate	TP	•	•	•	
SS Center Vent Drain and Bushing	CV	g	g	g	
Blind DIN SS Flanges Mounted with NACE Bolts	B2	d	d	d	
Calibration Test Report and Certificate of Conformance (F3399)	F1	•	•	•	b
Certificate of Conformance (F3391)	F3	•	•	•	b
Certificate of Origin (F0195)	F5	•	•	•	
NACE Certificate (F0198)	F7	o	o	o	
Additional Warranty - 1 year	W1	•	•	•	b
Additional Warranty - 2 years	W2	•	•	•	b
Additional Warranty - 3 years	W3	•	•	•	b
Additional Warranty - 4 years	W4	•	•	•	b
Laminar Flow Element Software	LF	•	•	•	

Table III continued next page.

TABLE III - OPTIONS (continued)

Approval Body	Approval Type	Location or Classification	STX1XX Selection	Availability 10	25	70	Restriction
Factory Mutual	Explosion Proof	Class I, Div. 1, Groups A,B,C,D	F1D3	•	•	•	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 ≤ 93°C					
	Explosion Proof	Class I, Div. 1, Groups B,C,D	F1C3	•	•	•	
	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 ≤ 93°C					
CSA	Explosion Proof	Class I, Div. 1, Groups B,C,D	C1C3	•	•	•	
	Dust Ignition Proof	Class II, III, Div. 1, Groups E,F,G					
	Suitable for use in	Class 1, 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 ≤ 93°C					
Zone 2 (Europe)	Self-Declared per 94/9/EC (ATEX 4)	Ex II 3 GD X, Vmax = 42 Vdc T4 at Ta = 93°C T5 at Ta = 80°C T6 at Ta = 65°C	H2D5	•	•	•	
LCIE (CENELEC)	Flame Proof Intrinsically Safe	EEx d IIC T6 EEx ia IIC T5	E1D8	•	•	•	

TABLE IV

Factory Identification	XXXX	•	•	•

RESTRICTIONS

Restriction Letter	Available Only With: Table	Selection	Not Available With: Table	Selection
b	Select only one option from this group.			
c	I	_ _ H		
d	I III	E _ A, F _ A, G _ A, H _ A DN	III	SV, CV
g			I III	J _ _, K _ _, L _ _ SV, B2
j	I	_ 2 _		
n			III	F1C3, F1D3, C1C3
o	III	CR or B2		
p			III	Functions in the analog mode only.
t	III	S2, T2 or V2		
u	III	F1C3, F1D3, C1C3		
v	Includes side vent drain - no price add.			
w	I	E _ A, F _ A, G _ A, H _ A	III	SV
y			III	DN, B2, CV

Example: SMA125-E1A-00000-MB,MC,F1D3 + XXXX

Model Selection Guide, continued

RTD assembly available from Honeywell Inc.

RTD Probe Assembly 22 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Selection	Code
Probe Style	
1/4-inch Rigid Probe	B
1/4-inch Spring-Loaded Probe	D
Sheath Material	
Stainless Steel	S
Inconel	I
Other (Consult Phoenix STC)	O
Probe Type	
100 Ohm DIN (0.00385) Platinum	11
Service Parameter	
Standard (25 gS)	S
Heavy Duty (50 gS)	H
Stem Length Dimension	
Stem length in inches (3" minimum, 24" maximum)	A
Probe Lag Hardware 1/2-inch NPT SST Fittings (22D only)	
Hex Nipple as 3/4-inch Standard 316 SS. Specify as "A3/4"	A3/4
Specify Straight Nipple as "BX"; where X = 3-inch, 6-inch, 9-inch lengths.	B3 B6 B9
Specify Double Lags and Union as "CX"; where X = mated lengths of 3-inch, 8-inch, 10-inch or 14-inch.	C3 C8 C10 C14
Remote Connection Head	
Explosionproof, standard cast aluminum	R
Plastic (not explosionproof)	PL
Polypropylene (not explosionproof)	PO
Lead Length*	
Minimum lead length, as required, 2.5" average	A
Lead length (X) as specified, 3-6", above 6"	X
Maximum Operating Temperature	
Options	
Standard wired-on SST tag	SST
Certificate of Probe Calibration (2-point)	CC2
Certificate of Probe Calibration (3-point)	CC3
Certificate of Probe Calibration (4-point)	CC4

* Caution: Excessive lead lengths may result in lead wire damage due to space limitations within the remote head

Model Selection Guide, continued

Thermocouple assembly available from Honeywell Inc.

Thermocouple Probe Assembly 78 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Selection	Code
Probe Style	
1/4-inch Rigid Probe	B4
1/4-inch Spring-Loaded Probe	D4
Sheath Material	
Stainless Steel	S
Inconel	I
Other (Consult Phoenix STC)	O
Thermocouple Type	J
	K
	T
	E
Number of Elements	
Single element	S
Dual element	D
Type of Junction	
Grounded	G
Ungrounded	U
Stem Length Dimension	
Stem length in inches (3" minimum, 24" maximum)	A
Probe Lag Hardware 1/2-inch NPT SST Fittings (78D4 only)	
Hex Nipple as 3/4-inch Standard 316 SS. Specify as "A3/4"	A3/4
Specify Straight Nipple as "BX"; where X = 3-inch, 6-inch, 9-inch lengths.	B3
	B6
	B9
Specify Double Lags and Union as "CX"; where X = mated lengths of 3-inch, 8-inch, 10-inch or 14-inch.	C3
	C8
Note: Stem length plus lag length cannot exceed 24" total without prior factory consultation.	C10
	C14
Remote Connection Head	
Explosionproof, standard cast aluminum	R
Plastic (not explosionproof)	PL
Polypropylene (not explosionproof)	PO
Lead Length*	
Minimum lead length, as required, 3" average	A
Lead length (X) as specified, 3-6", above 6"	X
Maximum Operating Temperature	
Options	
Standard wired-on SST tag	SST
Certificate of Probe Calibration (2-point)	CC2
Certificate of Probe Calibration (3-point)	CC3
Certificate of Probe Calibration (4-point)	CC4

***** Caution: Excessive lead lengths may result in lead wire damage due to space limitations within the remote head

Ordering Information

Contact your nearest Honeywell sales office, or

In the U.S.:
Honeywell
Industrial Automation & Control
16404 N. Black Canyon Highway
Phoenix, AZ 85023
1-800-288-7491

In Canada:
The Honeywell Centre
155 Gordon Baker Rd.
North York, Ontario
M2H 3N7
1-800-461-0013

In Latin America:
Honeywell Inc.
480 Sawgrass Corporate Parkway,
Suite 200
Sunrise, FL 33325
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