



Model SLAMf

SLAMf Series

Thermal Mass Flow

Elastomer Sealed, Digital, Thermal Mass Flow Meters and Controllers

Overview

The SLA Series mass flow meters and mass flow controllers have gained broad acceptance as the standard for accuracy, stability and reliability. These products have a wide flow measurement range and are suitable for a broad range of temperature and pressure conditions making them well suited for applications in chemical and petrochemical research, laboratory, analytical, fuel cell, life science among others.

Highlights of the SLAMf Series mass flow product include: industry leading long term stability, accuracy backed by superior metrology systems and methods using primary calibration systems directly traceable to international standards and a broad range of analog and digital I/O options to suit virtually any application. An independent diagnostic/service port permits users to troubleshoot or change flow conditions without removing the mass flow controller from service. The SLAMf Series products have NEMA 4X and IP66 weatherproof protection enclosures for 'Hosedown' applications such as; Food, Beverage, Pilot Plants, Pharmaceutical and Biotech.

Product Description

The SLAMf Series provides a highly configurable platform based on a simple modular architecture. The SLAMf Series feature set was carefully selected to enable drop-in replacement and upgrade of many brands of mass flow controllers. With the wide range of options and features available, the SLAMf Series provides users with a single platform to support a broad range of applications.

Features and Benefits

| Features | Benefits |
|--------------------------------------|---|
| Industry leading sensor stability | Increased system throughput and reduced cost of ownership by reducing maintenance and eliminating periodic recipe adjustments and/or recalibrations |
| User accessible service port | Simplified installation, start-up, troubleshooting and access to diagnostics provides maximum uptime |
| Advanced diagnostics | Ensures device is operating within user specified limits for high process yield and maximum uptime |
| Superior valve technology | Minimum leak-by, maximum turndown, and fast response reduces overall gas panel cost and increases throughput |
| Adaptable mechanical configurations | Easily retrofit to existing systems |
| Primary standard calibration systems | Ensures measurement accuracy is traceable to international standards |
| Simple modular design | Easy-to-service elastomer sealed design provides for factory or field service maximizing uptime and reducing total cost of ownership |

Product Description

Advanced Thermal Flow Measurement Sensor

Brooks' sensor technology combines:

- Excellent signal to noise performance for improved accuracy at low setpoints
- Superior long-term stability through enhanced sensor manufacturing and burn in process
- Isothermal packaging to reduce sensitivity to external temperature changes
- Corrosion resistant sensor flow path

Advanced Diagnostics

The mass flow controller remains the most complex and critical component in gas delivery systems. When dealing with highly toxic or corrosive gases, removing the mass flow controller to determine if it is faulty should be the last resort. In response to this, Brooks pioneered smarter mass flow controllers with embedded self test routines and introduced an independent diagnostic/service port to provide the user with a simple interface, for troubleshooting without disturbing flow controller operation.

Wash-down Enclosure

The SLAMf Series comes equipped with an IP66 / NEMA4X rated enclosure. This makes these instruments perfect for wash-down or outdoor environments. So no matter how harsh the surroundings, the SLAMf Series keeps the process under control.

Wide Flow Range

The SLAMf Series covers an extremely broad range of flow rates. Model SLAMf50 can have a full scale flow as low as 3 ccm. With a high turndown ratio of 100:1 for any full scale range from 1-50 lpm N₂ equivalent and 50:1 turndown for all other flow rates, accurate gas flow can be measured or controlled down to 0.06 ccm! Model SLAMf53 can monitor or control gas flows up to 2500 lpm

Fast Response Performance

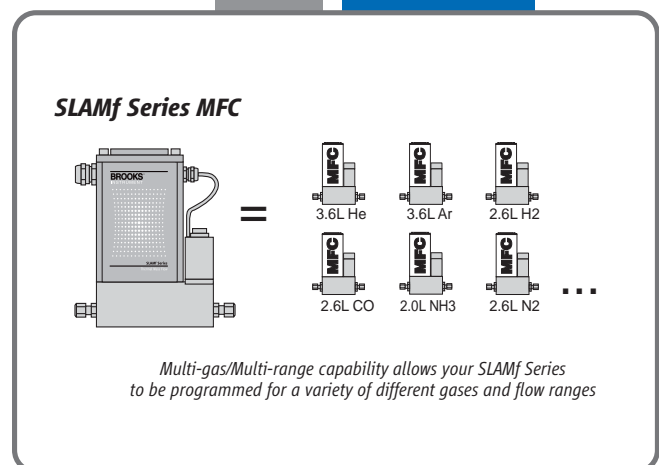
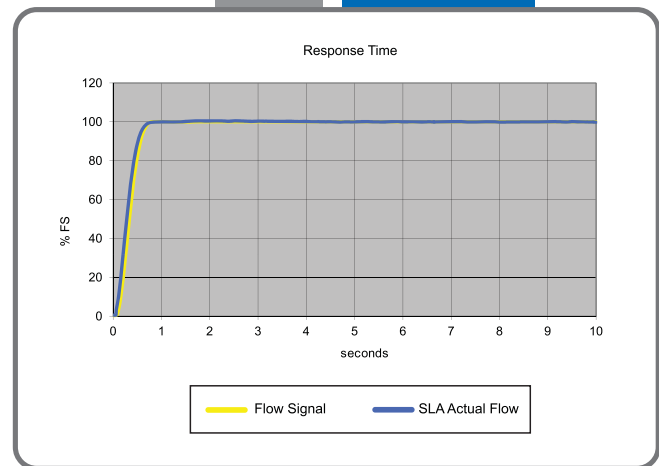
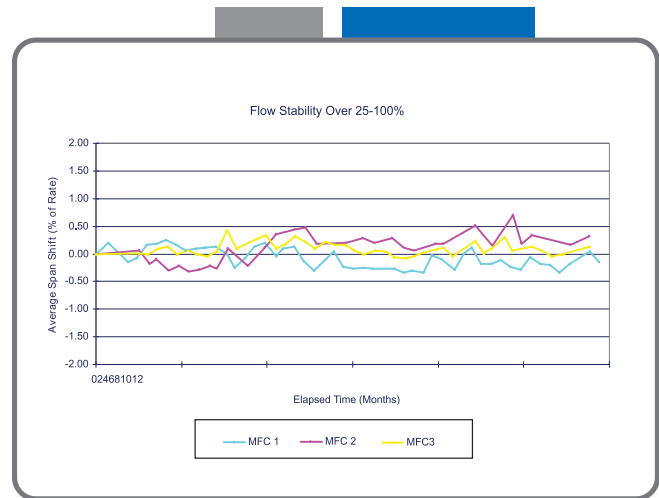
The all-digital electronics and superior mechanical configuration in the SLAMf Series provide for ultra fast response characteristics.

Broad Array of Communication Options

Brooks offers traditional 0-5 volt and 4-20mA analog options as well as RS485 digital communications ("S-protocol", based on HART) Brooks also offers control interfaces via digital network protocols like DeviceNet, a high speed (up to 500k baud) digital communication network, and Profibus. Brooks' communication capabilities and device-profiles have been certified by the ODVA (Open DeviceNet Vendor's Association) and the ITK (Interoperability Test Kit). Other network protocols are in development. Talk to your Brooks representative about your specific needs.

Industrial Multi-gas/Multi-range Capabilities

The SLAMf allows multi-gas and multi-range capabilities to reduce customer inventory. Storage and pre-programming of up to 6 gas calibrations easily permits users to switch between different gasses and ranges on a single device.

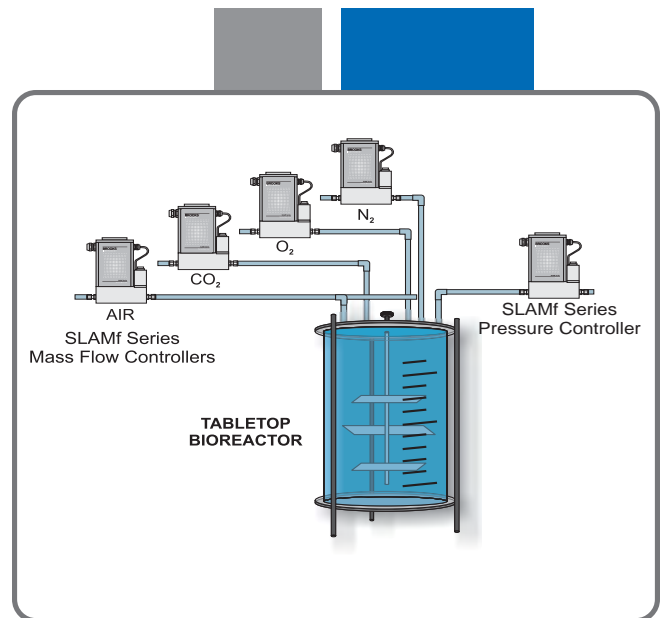


Product Applications

Bioreactors

Brooks has earned a leading reputation in controlling of gas flows for bioreactor applications.

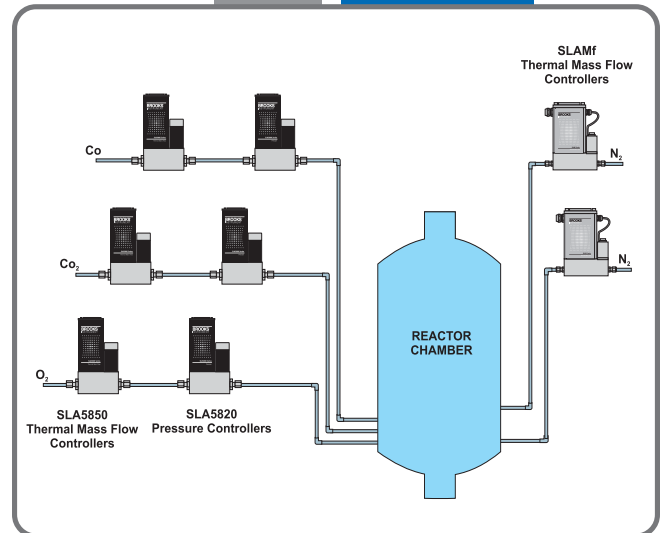
For applications where dissolved oxygen and pH control are more critical, mass flow controllers provide the next level of precision and automation. Brooks offers a wide range of solutions including multiple gas calibrations on the SLAMf. With optional digital communication protocols, NEMA 4X/IP66 enclosures to prevent dust/moisture from getting in, and other features offered by the SLAMf, it is ideally suited for bioreactors.



Petrochemical Pilot Plants

When designing new petrochemical pilot plants, customers not only need a product that is repeatable, accurate, and resistant to long term sensor drift, they also need products that can withstand hazardous areas and conditions.

Brooks' SLAMf is Class 1, Div 2 area classified, making them suitable for environments that contain a large number of flammable gases. It is also safe to use for outdoor environments due to the NEMA 4X/IP66 enclosure, which prevents weather and harsh elements from damaging the mass flow controller.

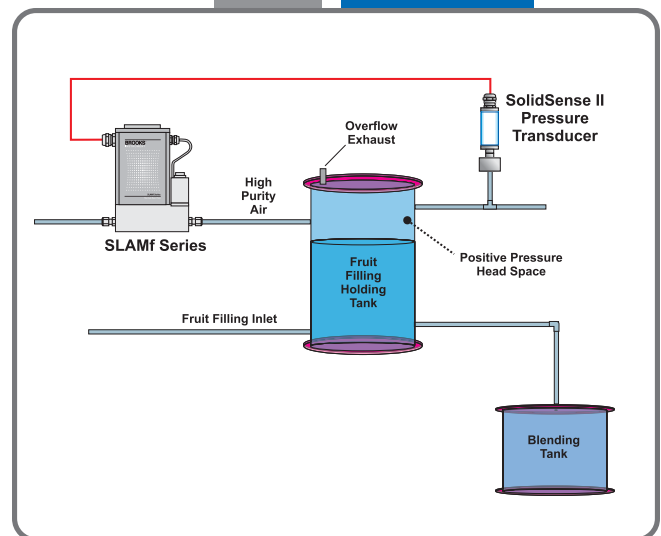


Blanketing in Food Processing

Brooks has continuously challenged itself to provide our customers with solutions that provide superior results. This approach has even applied to the food processing industry.

For making fruit filled yogurt, fruit filling is held in holding tanks until it is needed. During production the tank is emptied into blend tanks and then sent to a fill line until the tank is empty. The production area is cleaned using a warm wash down, while the tank is cleaned using steam sterilization. The tank is then backfilled with high purity air to prevent contamination.

The SLAMf is the perfect product for this application. The NEMA 4X enclosure prevents unwanted moisture, caused by the wet environment, from contaminating the high purity air flowing through the MFC. In addition, a SolidSense II pressure transducer is also used to control the head pressure in the tank. The SLAMf can adjust the air flow to the tank based off the signals sent by the SolidSense II pressure transducer.



Product Specifications

Flow Ranges and Pressure Ratings:

| Mass Flow Controller Model | Mass Flow Meter Model | Flow Ranges N2 Eq. Ratings | | Pressure Unit psi/bar | | PED Module H Category |
|----------------------------|-----------------------|-------------------------------|-----------|--------------------------|------------------|---|
| | | Min. F.S. | Max. F.S. | Standard | Optional | |
| SLAMf50 | SLAMf60 | 0.003 | 50 lpm | 1500 psi/100 bar | 4500 psi/310 bar | SEP |
| SLAMf51 | SLAMf61 | 15 | 100 lpm* | 1500 psi/100 bar | NA** | SEP |
| SLAMf53 | SLAMf63 | 100 | 2500 lpm | 1000 psi/70 bar | NA | 1 for all 150 lb flanges 2 for all other connections |

* 200 lpm of H2 possible, 600 lpm of H2 possible with decreased accuracy

** 4500 psi/310 bar available as a special on the SLAMf61 only

Performance

| | SLAMf50/60 | SLAMf51/61 | SLAMf53/63 |
|--|--|------------|--|
| Flow Accuracy | ±0.9% of S.P. (20-100% F.S.), ±0.18% of F.S. (2-20% F.S., 1-20% F.S. from 1-50 lpm) | | ±0.9% of S.P. (20-100% F.S.), ±0.18% of F.S. (2-20% F.S.) up to 1100 lpm ±1.0% of F.S. from 1100 lpm up to 2500 lpm |
| Control Range | Turndown 100:1 for F.S. from 1-50 lpm (50:1 for all other F.S. flows) | | |
| Repeatability & Reproducibility | 0.20% S.P. | | |
| Linearity | Included in accuracy | | |
| Response Time (Settling Time within ±2% F.S. for 0-100% command step)* | < 1 second | | < 3 seconds |
| Zero Stability | < ± 0.2% F.S. per year | | |
| Temperature Coefficient | Zero: <0.05% of F.S. per °C. Span: < 0.1% of S.P. per °C | | |
| Pressure Coefficient | ±0.03% per psi (0-200 psi N2) | | |
| Attitude Sensitivity | <0.2% F.S. maximum deviation from specified accuracy after re-zeroing | | |

Ratings

| | | | |
|---|---|-----------------|---|
| Operating Temperature Range | 0-65°C (32-149°F) | | |
| Minimum Pressure Differential (Controllers) | 5 psi/0.35 bar | 10 psi/0.69 bar | Min.: 7.5 psi/0.52 bar at 500 lpm Min.: 14.5 psi/1.00 bar at 1000 lpm Min.: 35.0 psi/2.41 bar at 2500 lpm |
| Maximum Pressure Differential (Controllers) | Application specific up to 1500 psi/103.4 bar | 50 psi/3.45 bar | 300 psi/20.0 bar |
| Leak Integrity (external) | 1x10 ⁻⁹ atm. cc/sec He | | |

Mechanical

| | |
|--------------------------|---|
| Valve Type | Normally Closed, Normally Open, Meter |
| Primary Wetted Materials | 316L Stainless Steel, High Alloy Stainless Steel, Viton® fluoroelastomers, Buna-N, Kalrez®, Teflon®/Kalrez®, and EPDM |






* Response time can be improved upon request

Diagnostics

| | |
|-------------------------|--|
| Status Lights | MFC Health, Network Status |
| Alarms* | Sensor Output, Control Valve Output, Over Temperature, Power Surge/Sag, Network Interruption |
| Diagnostic/Service Port | RS485 via 2.5mm jack (Located under the top cover) |

* Alarm modes are dependent on the communications interface. These are described in the corresponding digital communication interface manual.

Certifications

| Mark | Agency | Certification | Applicable Standard | Status |
|---|-----------------|---|---|---------|
|  | CE | EMC Directive 2004/108/EC | EN:61326-1:2006 | Pass |
|  | UL (Listed) | Class I, Div 2, Group A, B, C, D Class II, Div 2, Group F, G & Class III | CSA C22.2 NO. 213-M1987 ISA 12.12.01 | Pending |
|  | UL (Recognized) | Class I, Div 2, Group A, B, C, D | CSA C22.2 NO. 213-M1987 ISA 12.12.01 | Pending |
|  | ATEX | II 3 G Ex nA IIC T4 Gc II 3 D Ex ic IIIC T85°C Db | EN 60079-0:2012, EN 60079-15:2010, EN 60079-31:2009 | Pending |
|  | IECEX | II 3 G Ex nA IIC T4 Gc II 3 D Ex ic IIIC T85 °C Db | IEC 60079-0:2011, IEC 60079-15:2010, EN 60079-31:2008 | Pending |

Electrical Specifications

| Communication Protocol | RS485 | Profibus® | DeviceNet™ |
|---------------------------------------|---|-----------|---|
| Electrical Connection | All: PG11 Cable Gland, 1/2" NPT (F) Conduit, M20 x 1.5 Conduit DeviceNet Only: 5-Pin Micro Connector | | |
| Analog I/O | 0-5 V, 1-5 V, 0-10 V, 0-20 mA, 4-20 mA | | N/A |
| Power Max./Purge | From +13.5 Vdc to +27 Vdc | | From +11 Vdc to +25 Vdc |
| Power Requirements Watts, Max. | Valve Orifice > 0.032": 8 W Valve Orifice ≤ 0.032": 5 W Without Valve: 2 W | | Valve Orifice > 0.032": 10 W Valve Orifice ≤ 0.032": 7 W Without Valve: 4 W |

Voltage Set Point Input Specifications

| | | |
|-----------------------------------|------------------------------|-----|
| Nominal Range | 0-5 Vdc, 1-5 Vdc or 0-10 Vdc | N/A |
| Full Range | (-0.5)-11 Vdc | N/A |
| Absolute Max. | 18 V (without damage) | N/A |
| Input Impedence | >990 kOhms | N/A |
| Required Max. Sink Current | 0.002 mA | N/A |

Current Set Point Input Specifications

| | | |
|------------------------|------------------------|-----|
| Nominal Range | 4-20 mA or 0-20 mA | N/A |
| Full Range | 0-22 mA | N/A |
| Absolute Max. | 24 mA (without damage) | N/A |
| Input Impedence | 100 Ohms | N/A |

Flow Output (Voltage) Specifications

| | | |
|----------------------------|------------------------------|-----|
| Nominal Range | 0-5 Vdc, 1-5 Vdc or 0-10 Vdc | N/A |
| Full Range | (-1)-11 Vdc | N/A |
| Min Load Resistance | 2 kOhms | N/A |

Flow Output (Current) Specifications

| | | |
|----------------------|--|-----|
| Nominal Range | 0-20 mA or 4-20 mA | N/A |
| Full Range | 0-22 mA (@ 0-20 mA); 3.8-22 mA (@ 4-20 mA) | N/A |
| Max. Load | 380 Ohms (for supply voltage: < 16 Vdc) 580 Ohms (for supply voltage: ≥ 16 Vdc) | N/A |

Analog I/O Alarm Output*

| | | |
|---------------------------------|----------------|-----|
| Type | Open Collector | N/A |
| Max. Closed (On) Current | 25 mA | N/A |
| Max. Open (Off) Leakage | 1µA | N/A |
| Max. Open (Off) Voltage | 30 Vdc | N/A |

Analog I/O Valve Override Signal Specifications**

| | | |
|----------------------------------|--|-----|
| Floating/Unconnected | Instrument controls valve to command set point | N/A |
| VOR < 0.3 Vdc | Valve Closed | N/A |
| 1 Vdc < VOR < 4 Vdc | Valve Normal | N/A |
| VOR > 4.8 Vdc | Valve Open | N/A |
| Input Impedence | 800 kOhms | N/A |
| Absolute Max. Input | (-25 Vdc) < VOR < 25 Vdc (without damage) | N/A |

*The Alarm Output is an open collector or "contact type" that is CLOSED (on) whenever an alarm is active.

The Alarm Output may be set to indicate any one of various alarm conditions.

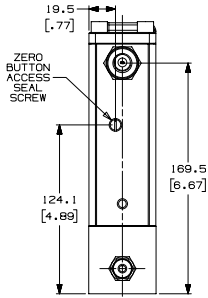
** The Valve Override Signal (VOR) is implemented as an analog input which measures the voltage at the input and controls the valve based upon the measured reading as shown in this section.

Product Dimensions

SLAMf50, Analog/RS485

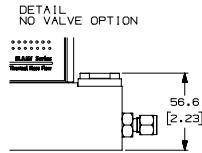
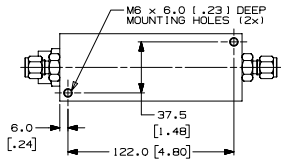
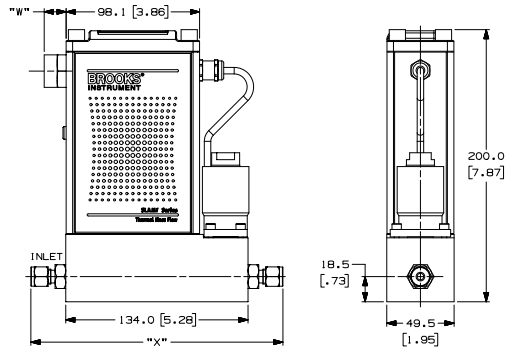
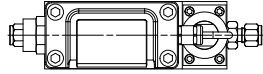
MM/1 INCH

| CABLE CONNECTOR | "W" DIMENSION |
|---|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. CABLE | 28.6 [1,12] |
| 1/2" NPT-F CONDUIT | 16.5 [0,65] |
| M20x1.5 (F) CONDUIT | 12.5 [0,49] |

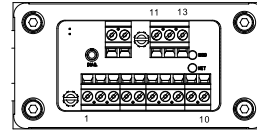


| FITTING | "X" DIMENSION |
|-----------------|----------------|
| 1/8" TUBE COMP. | **180.7 [7,12] |
| 1/4" TUBE COMP. | **185.3 [7,30] |
| 3/8" TUBE COMP. | **188.4 [7,42] |
| 1/2" TUBE COMP. | **192.4 [7,58] |
| 1/4" VCR | 181.8 [7,16] |
| 1/4" VCO | 173.6 [6,84] |
| 1/4" NPT-F | 176.2 [6,94] |
| 6mm TUBE COMP. | **185.4 [7,30] |
| 10mm TUBE COMP. | **188.8 [7,43] |
| 3/8"-1/2" VCR | 189.4 [7,46] |
| 3/8"-1/2" VCO | 184.8 [7,28] |
| 1/4" RC-F (BSP) | 174.2 [6,86] |

* OVERALL LENGTH FINGER TIGHT



TOP VIEW
SHOWN WITH COVER REMOVED

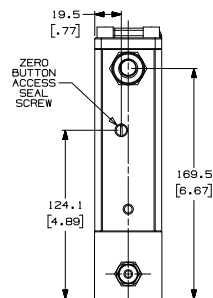


| TERMINAL | FUNCTION |
|----------|---------------------------------|
| 1 | SETPOINT COMMON |
| 2 | FLOW OUTPUT (0-5V, 1-5V) |
| 3 | ALARM OUT |
| 4 | FLOW OUTPUT (0-20mA, 4-20mA) |
| 5 | POWER SUPPLY (13.3-27V) |
| 6 | SETPOINT INPUT (0-20mA, 4-20mA) |
| 7 | SETPOINT INPUT (0-5V, 1-5V) |
| 8 | POWER COMMON |
| 9 | FLOW OUT COMMON |
| 10 | VALVE OVERRIDE INPUT |
| 11 | AUX INPUT (0-5V, 0-10V) |
| 12 | RS-485, B (-), INPUT/OUTPUT |
| 13 | RS-485, A (+), INPUT/OUTPUT |

SLAMf60, Analog/RS485

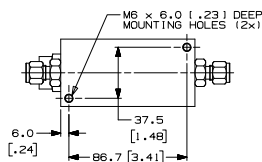
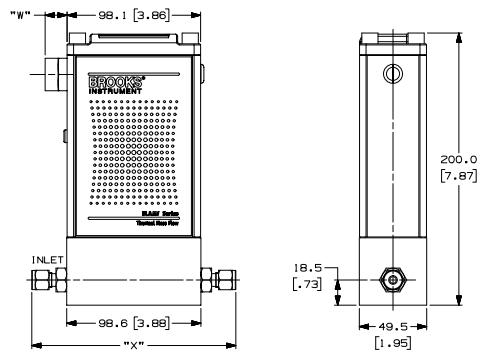
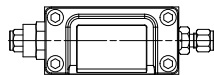
MM/1 INCH

| CABLE CONNECTOR | "W" DIMENSION |
|---|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. CABLE | 28.6 [1,12] |
| 1/2" NPT-F CONDUIT | 16.5 [0,65] |
| M20x1.5 (F) CONDUIT | 12.5 [0,49] |

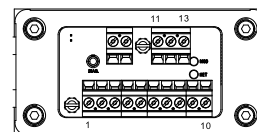


| FITTING | "X" DIMENSION |
|-----------------|----------------|
| 1/8" TUBE COMP. | **145.3 [5,72] |
| 1/4" TUBE COMP. | **149.9 [5,90] |
| 3/8" TUBE COMP. | **152.9 [6,02] |
| 1/2" TUBE COMP. | **157.0 [6,18] |
| 1/4" VCR | 146.3 [5,76] |
| 1/4" VCO | 138.2 [5,44] |
| 1/4" NPT-F | 140.7 [5,54] |
| 6mm TUBE COMP. | **149.9 [5,90] |
| 10mm TUBE COMP. | **153.2 [6,03] |
| 3/8"-1/2" VCR | 153.9 [6,06] |
| 3/8"-1/2" VCO | 149.4 [5,88] |
| 1/4" RC-F (BSP) | 138.8 [5,46] |

* OVERALL LENGTH FINGER TIGHT



TOP VIEW
SHOWN WITH COVER REMOVED



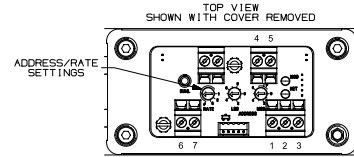
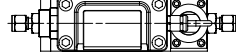
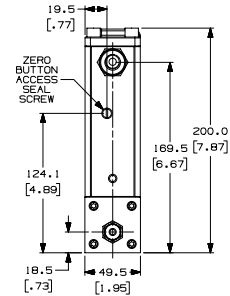
| TERMINAL | FUNCTION |
|----------|---------------------------------|
| 1 | SETPOINT COMMON |
| 2 | FLOW OUTPUT (0-5V, 1-5V) |
| 3 | ALARM OUT |
| 4 | FLOW OUTPUT (0-20mA, 4-20mA) |
| 5 | POWER SUPPLY (13.3-27V) |
| 6 | SETPOINT INPUT (0-20mA, 4-20mA) |
| 7 | SETPOINT INPUT (0-5V, 1-5V) |
| 8 | POWER COMMON |
| 9 | FLOW OUT COMMON |
| 10 | VALVE OVERRIDE INPUT |
| 11 | AUX INPUT (0-5V, 0-10V) |
| 12 | RS-485, B (-), INPUT/OUTPUT |
| 13 | RS-485, A (+), INPUT/OUTPUT |

Product Dimensions (continued)

SLAMf51, DeviceNet

MM/1 INCH

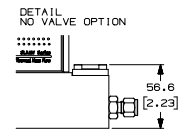
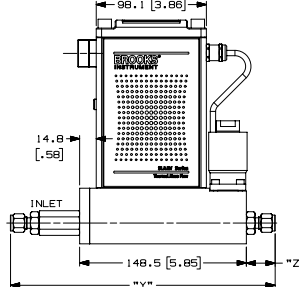
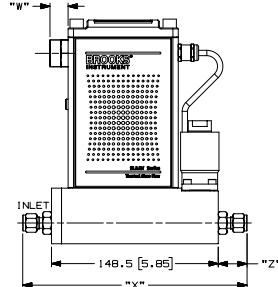
| CABLE CONNECTOR | "W" DIMENSION |
|--|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. CABLE | 28.6 (1.12) |
| 1/2" NPT-F CONDUIT | 16.5 (0.65) |
| M20x1.5 (F) CONDUIT | 12.5 (0.49) |



| TERMINAL | FUNCTION |
|----------|-------------------------|
| 1 | DRAIN |
| 2 | POWER SUPPLY (11-25V) |
| 3 | POWER COMMON |
| 4 | CAN_H |
| 5 | CAN_L |
| 6 | AUX COMMON |
| 7 | AUX INPUT (0-5V, 0-10V) |

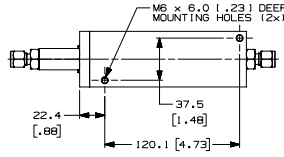
FRONT VIEW WITHOUT FILTER

FRONT VIEW WITH STANDARD FILTER



| FITTING | "X" DIMENSION (Without Standard Filter) | "Y" DIMENSION (With Standard Filter) | "Z" DIMENSION |
|-----------------|---|--------------------------------------|---------------|
| 9/16"-18 UNF | 148.5 (5.85) | 184.5 (7.26) | N/A |
| 1/4" TUBE COMP. | 199.8 (7.87) | 235.8 (9.28) | 25.7 (1.01) |
| 3/8" TUBE COMP. | 202.9 (7.99) | 238.8 (9.40) | 27.2 (1.07) |
| 1/2" TUBE COMP. | 206.9 (8.15) | 242.9 (9.56) | 29.2 (1.15) |
| 1/4" VCR | 196.3 (7.73) | 232.2 (9.14) | 23.9 (0.94) |
| 1/4" VCO | 188.1 (7.41) | 224.1 (8.82) | 19.8 (0.78) |
| 1/4" NPT | 180.7 (7.11) | 226.7 (8.92) | 21.1 (0.83) |
| 6mm TUBE COMP. | 199.9 (7.87) | 235.8 (9.28) | 25.7 (1.01) |
| 10mm TUBE COMP. | 203.3 (8.00) | 239.4 (9.42) | 27.4 (1.08) |
| 3/8"-1/2" VCR | 203.9 (8.03) | 239.9 (9.44) | 27.7 (1.09) |
| 3/8"-1/2" VCO | 199.3 (7.85) | 235.3 (9.26) | 25.4 (1.00) |
| 1/4" RC (BSP) | 188.7 (7.43) | 224.6 (8.84) | 20.1 (0.79) |

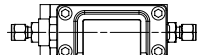
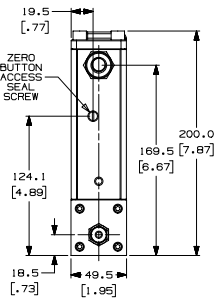
• OVERALL LENGTH FINGER TIGHT



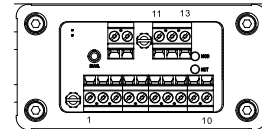
SLAMf61, Analog/RS485

MM/1 INCH

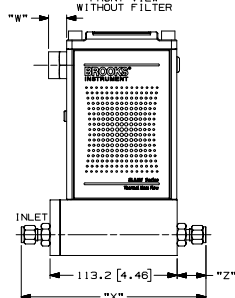
| CABLE CONNECTOR | "W" DIMENSION |
|--|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. CABLE | 28.6 (1.12) |
| 1/2" NPT-F CONDUIT | 16.5 (0.65) |
| M20x1.5 (F) CONDUIT | 12.5 (0.49) |



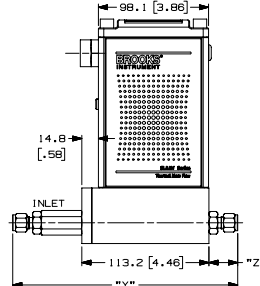
TOP VIEW SHOWN WITH COVER REMOVED



| TERMINAL | FUNCTION |
|----------|---------------------------------|
| 1 | SETPOINT COMMON |
| 2 | FLOW OUTPUT (0-5V, 1-5V) |
| 3 | ALARM OUT |
| 4 | FLOW OUTPUT (0-20mA, 4-20mA) |
| 5 | POWER SUPPLY (13.5-27V) |
| 6 | SETPOINT INPUT (0-20mA, 4-20mA) |
| 7 | SETPOINT INPUT (0-5V, 1-5V) |
| 8 | POWER COMMON |
| 9 | FLOW OUT COMMON |
| 10 | VALVE OVERRIDE INPUT |
| 11 | AUX INPUT (0-5V, 0-10V) |
| 12 | RS-485_B (-) INPUT/OUTPUT |
| 13 | RS-485_A (+) INPUT/OUTPUT |

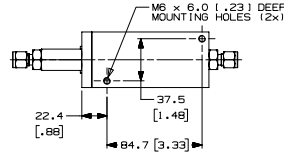


FRONT VIEW WITH STANDARD FILTER



| FITTING | "X" DIMENSION (Without Standard Filter) | "Y" DIMENSION (With Standard Filter) | "Z" DIMENSION |
|-----------------|---|--------------------------------------|---------------|
| 9/16"-18 UNF | 113.2 (4.46) | 149.2 (5.87) | N/A |
| 1/4" TUBE COMP. | 164.5 (6.48) | 209.4 (8.24) | 25.7 (1.01) |
| 3/8" TUBE COMP. | 167.6 (6.60) | 212.5 (8.36) | 27.2 (1.07) |
| 1/2" TUBE COMP. | 171.6 (6.76) | 216.5 (8.52) | 29.2 (1.15) |
| 1/4" VCR | 161.0 (6.34) | 205.9 (8.10) | 23.9 (0.94) |
| 1/4" VCO | 152.9 (6.02) | 197.7 (7.78) | 19.8 (0.78) |
| 1/4" NPT | 155.4 (6.12) | 200.3 (7.89) | 21.1 (0.83) |
| 6mm TUBE COMP. | 164.5 (6.48) | 209.5 (8.25) | 25.7 (1.01) |
| 10mm TUBE COMP. | 167.9 (6.61) | 212.9 (8.39) | 27.4 (1.08) |
| 3/8"-1/2" VCR | 168.7 (6.64) | 213.5 (8.40) | 27.7 (1.09) |
| 3/8"-1/2" VCO | 164.1 (6.46) | 208.9 (8.22) | 25.4 (1.00) |
| 1/4" RC (BSP) | 153.4 (6.04) | 198.3 (7.81) | 20.1 (0.79) |

• OVERALL LENGTH FINGER TIGHT

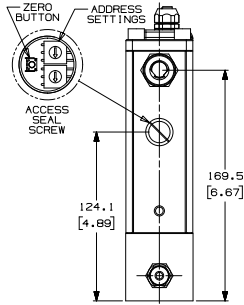


Product Dimensions (continued)

SLAMf60, Profibus

MM/1 INCH

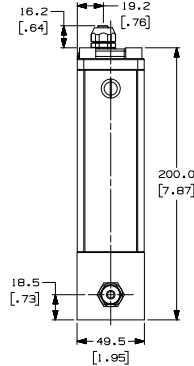
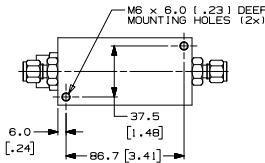
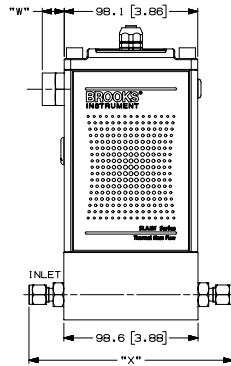
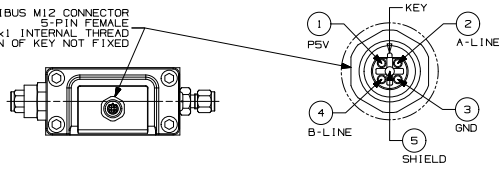
| CABLE CONNECTOR CABLE GLAND 0.20 [5.1] TO 0.39 [9.9] DIA. CABLE | "W" DIMENSION |
|---|---------------|
| | 28.6 [1.12] |
| 1/2" NPT-F CONDUIT | 16.5 [0.65] |
| M20x1.5 (F) CONDUIT | 12.5 [0.49] |



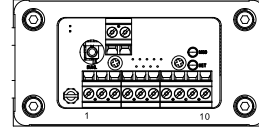
| FITTING | "X" DIMENSION |
|-----------------|---------------|
| 1/8" TUBE COMP. | *145.3 [5.72] |
| 1/4" TUBE COMP. | *149.9 [5.90] |
| 3/8" TUBE COMP. | *152.9 [6.02] |
| 1/2" TUBE COMP. | *157.0 [6.18] |
| 1/4" VCR | 146.3 [5.76] |
| 1/4" VCO | 138.2 [5.44] |
| 1/4" NPT-F | 140.7 [5.54] |
| 6mm TUBE COMP. | *149.9 [5.90] |
| 10mm TUBE COMP. | *153.2 [6.03] |
| 3/8"-1/2" VCR | 153.9 [6.06] |
| 3/8"-1/2" VCO | 149.4 [5.88] |
| 1/4" RC-F (BSP) | 138.8 [5.46] |

* OVERALL LENGTH FINGER TIGHT

PROFIBUS M12 CONNECTOR
5-PIN FEMALE
M12x1 INTERNAL THREAD
ORIENTATION OF KEY NOT FIXED



TOP VIEW
SHOWN WITH COVER REMOVED



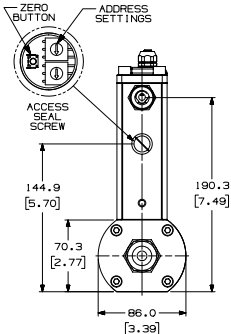
| TERMINAL | FUNCTION |
|----------|--------------------------|
| 1 | POWER SUPPLY (13.5-27V) |
| 2 | VALVE OVERRIDE INPUT |
| 3 | POWER COMMON |
| 4 | AUX COMMON |
| 5 | AUX INPUT (0-5V, 0-10V) |
| 6 | P5V (BROWN) |
| 7 | RXD/TXD - A-LINE (GREEN) |
| 8 | GROUND (BLUE) |
| 9 | RXD/TXD - B-LINE (RED) |
| 10 | SHIELD (GRAY) |

Product Dimensions (continued)

SLAMf53, Profibus

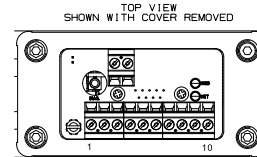
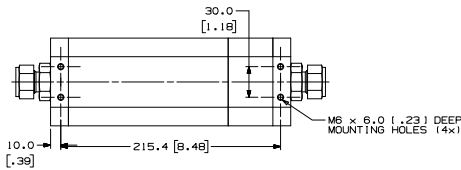
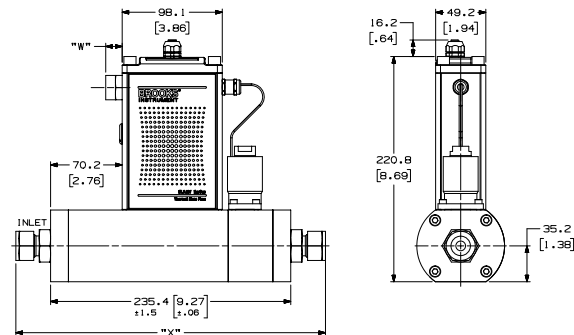
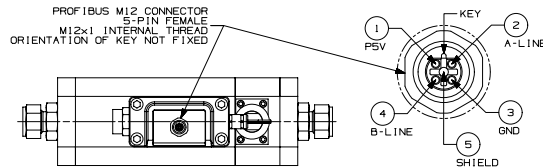
MM/1 INCH

| CABLE CONNECTOR | "W" DIMENSION |
|---|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. | 28.6 (1.12) |
| CABLE 1/2" NPT-F CONDUIT | 16.5 (0.65) |
| M20x1.5 (F) CONDUIT | 12.5 (0.49) |



| FITTINGS | "X" DIMENSION |
|-----------------|----------------|
| 9/16" - 18 UNF | 235.4 (9.27) |
| 1-1/16" - 12 UN | 235.4 (9.27) |
| 1-5/16" - 12 UN | 235.4 (9.27) |
| 1/2" NPT | 235.4 (9.27) |
| 1" NPT | 235.4 (9.27) |
| 1-1/2" NPT | 235.4 (9.27) |
| 1/2" RC (BSP) | 235.4 (9.27) |
| 1" RC (BSP) | 235.4 (9.27) |
| 3/8" TUBE COMP. | *290 (11.42) |
| 1/2" TUBE COMP. | *304 (11.97) |
| 3/4" TUBE COMP. | *304 (11.97) |
| 1" TUBE COMP. | *311.7 (12.27) |
| 1/2" VCO | 286.3 (11.27) |
| 3/4" VCO | 293.9 (11.57) |
| 1" VCO | 296.4 (11.67) |
| 1/2" VCR | 293.9 (11.57) |
| 3/4" VCR | 316.7 (12.47) |

* OVERALL LENGTH FINGER TIGHT

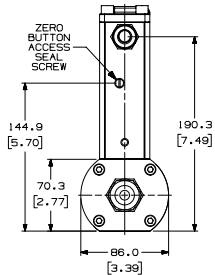


| TERMINAL | FUNCTION |
|----------|--------------------------|
| 1 | POWER SUPPLY (13.5-27V) |
| 2 | VALVE OVERRIDE INPUT |
| 3 | POWER COMMON |
| 4 | AUX COMMON |
| 5 | AUX INPUT (0-5V, 0-10V) |
| 6 | PSV (BROWN) |
| 7 | RXD/TXD - A-LINE (GREEN) |
| 8 | GROUND (BLUE) |
| 9 | RXD/TXD - B-LINE (RED) |
| 10 | SHIELD (GRAY) |

SLAMf63, DeviceNet

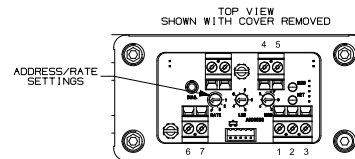
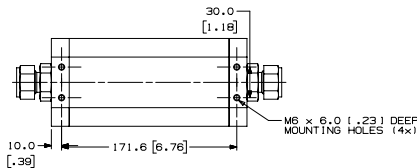
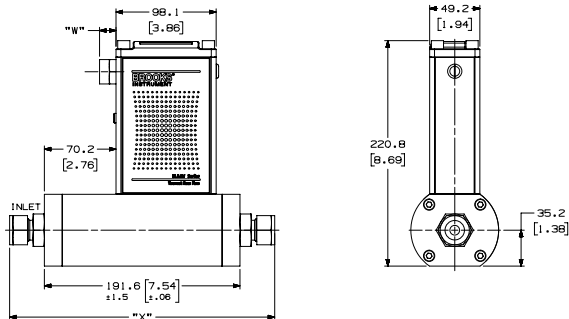
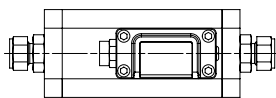
MM/1 INCH

| CABLE CONNECTOR | "W" DIMENSION |
|---|---------------|
| CABLE GLAND 0.20 (5.1) TO 0.39 (9.9) DIA. | 28.6 (1.12) |
| CABLE 1/2" NPT-F CONDUIT | 16.5 (0.65) |
| M20x1.5 (F) CONDUIT | 12.5 (0.49) |



| FITTINGS | "X" DIMENSION |
|-----------------|----------------|
| 9/16" - 18 UNF | 191.6 (7.54) |
| 1-1/16" - 12 UN | 191.6 (7.54) |
| 1-5/16" - 12 UN | 191.6 (7.54) |
| 1/2" NPT | 191.6 (7.54) |
| 1" NPT | 191.6 (7.54) |
| 1-1/2" NPT | 191.6 (7.54) |
| 1/2" RC (BSP) | 191.6 (7.54) |
| 1" RC (BSP) | 191.6 (7.54) |
| 3/8" TUBE COMP. | *246.0 (9.69) |
| 1/2" TUBE COMP. | *260.4 (10.25) |
| 3/4" TUBE COMP. | *260.4 (10.25) |
| 1" TUBE COMP. | *268.0 (10.55) |
| 1/2" VCO | 242.6 (9.55) |
| 3/4" VCO | 250.2 (9.85) |
| 1" VCO | 252.7 (9.95) |
| 1/2" VCR | 250.2 (9.85) |
| 3/4" VCR | 273.1 (10.75) |

* OVERALL LENGTH FINGER TIGHT



| TERMINAL | FUNCTION |
|----------|-------------------------|
| 1 | DRAIN |
| 2 | POWER SUPPLY (11-25V) |
| 3 | POWER COMMON |
| 4 | CAN_H |
| 5 | CAN_L |
| 6 | AUX COMMON |
| 7 | AUX INPUT (0-5V, 0-10V) |

Model Code

| Code Description | Code Option | Option Description |
|--|-------------|---|
| I. Base Model Numbers | SLA | Smart Link Advantage |
| II. Package / Finish Specifications | MF | Standard Elastomer Series |
| III. Function | 5 | Mass Flow Controller |
| | 6 | Mass Flow Meter |
| IV. Gas or Range | 0 | 3 ccm - 50 lpm |
| | 1 | 20 - 100 lpm |
| | 3 | 100 - 2500 lpm |
| V. Digital I/O Communication | A | None (select applicable analog I/O) |
| | D | DeviceNet I/O (with 5-pin micro connector) |
| | J | DeviceNet I/O (with PG11 cable gland) |
| | K | DeviceNet I/O (with M20x1.5 conduit) |
| | L | DeviceNet I/O (with 1/2" NPT (F) conduit) |
| | P | Profibus (5-pin female M12, M20x1.5 conduit) |
| | R | Profibus (5-pin female M12, PG11 cable gland) |
| | T | Profibus (5-pin female M12, 1/2" NPT (F) conduit) |
| VI. Mechanical Connection (Body size 0 & 1 only) | 1A | Without adapters, 9/16" - 18 UNF |
| | 1B | 1/4" tube compression |
| | 1C | 1/8" tube compression |
| | 1D | 3/8" tube compression |
| | 1E | 1/4" VCR |
| | 1F | 1/4" VCO |
| | 1G | 1/4" NPT |
| | 1H | 6mm tube compression |
| | 1J | 10mm tube compression |
| | 1L | 3/8"-1/2" VCR |
| | 1M | 3/8"-1/2" VCO |
| | 1P | 1/2" tube compression |
| | 1T | 1/4" RC (BSP) |
| | 1Y | 3mm tube compression |
| | B1 | 1/4" tube compression w/Filter |
| | C1 | 1/8" tube compression w/Filter |
| | D1 | 3/8" tube compression w/Filter |
| | E1 | 1/4" VCR w/Filter |
| | F1 | 1/4" VCO w/Filter |
| | G1 | 1/4" NPT w/Filter |
| | H1 | 6mm tube compression w/Filter |
| | J1 | 10mm tube compression w/Filter |
| | L1 | 3/8"-1/2" VCR w/Filter |
| | M1 | 3/8"-1/2" VCO w/Filter |
| | P1 | 1/2" tube compression w/Filter |
| | T1 | 1/4" RC (BSP) w/Filter |
| | Y1 | 3mm tube compression w/Filter |
| VI. Mechanical Connection (Body size 3 only) | 2A | Without adapters, 9/16" - 18 UNF |
| | 2B | 1-1/16"-12 SAE/MS |
| | 2C | 3/8" tube compression |
| | 2D | 1/2" tube compression |
| | 2E | 3/4" tube compression |
| | 2F | 1" tube compression |
| | 2G | 1/2" NPT (F) |
| | 2H | 1" NPT (F) |
| | 2J | 1-1/2" NPT (F) |
| | 2K | 1/2" VCO |
| | 2L | 3/4" VCO |
| | 2M | 1/2" VCR |
| | 2N | 1/2" RC (BSP) |
| | 2P | 1" RC (BSP) |
| | 2R | 1-5/16"-12 SAE/MS |
| | 2S | 1" VCO |
| | 2T | 3/4" VCR |
| | 2U | 1" VCR |
| | 3A | DIN DN15 PN40 Flange |
| | 3B | DIN DN25 PN40 Flange |
| | 3C | DIN DN40 PN40 Flange |
| | 3D | DIN DN15 PN40 Flange |

Model Code (continued)

| Code Description | Code Option | Option Description | | |
|--|-------------------------|---|----------------------|----------------------|
| VI. Mechanical Connection (cont.) (Body size 3 only) | 3E | ANSI 1/2" 150# RF Flange | | |
| | 3F | ANSI 1/2" 300# RF Flange | | |
| | 3G | ANSI 1" 150# RF Flange | | |
| | 3H | ANSI 1" 300# RF Flange | | |
| | 3J | ANSI 1-1/2" 150# RF Flange | | |
| | 3K | ANSI 1-1/2" 300# RF Flange | | |
| VII. O-ring Material | A | Viton | | |
| | B | Buna | | |
| | C | PTFE | | |
| | D | Kalrez | | |
| | E | EPDM | | |
| | J | FDA/USP Class VI - Viton | | |
| L | FDA/USP Class VI - EPDM | | | |
| VIII. Valve Seat | A | None (Sensor only) | | |
| | B | Viton (for body size 3, diaphragm material = PTFE) | | |
| | C | Buna (for body size 3, diaphragm material = PTFE) | | |
| | D | Kalrez (for body size 3, diaphragm material = PTFE) | | |
| | E | EPDM (for body size 3, diaphragm material = PTFE) | | |
| | F | PTFE | | |
| IX. Valve Type | 0 | None (Sensor only) | | |
| | 1 | Normally closed | | |
| | 2 | Normally closed (Pressure diff. >30 psig (2 bar)) | | |
| | 3 | Normally closed (Pressure diff. <30 psig (2 bar)) | | |
| | 4 | Normally closed - high pressure | | |
| | 5 | Normally open | | |
| X. Analog I/O Communications | A | None - Digital Communications only | | |
| | E | 4-20 mA | 0-5 Volt | PG11 Cable Gland |
| | F | 0-5 Volt | 0-5 Volt | PG11 Cable Gland |
| | G | 4-20 mA | 4-20 mA | PG11 Cable Gland |
| | H | 0-5 Volt | 4-20 mA | PG11 Cable Gland |
| | I | 0-5 Volt | 0-20 mA | PG11 Cable Gland |
| | J | 0-5 Volt | 0-5 Volt | 1/2" NPT (F) Conduit |
| | K | 4-20 mA | 0-20 mA | 1/2" NPT (F) Conduit |
| | N | 0-5 Volt | 0-5 Volt | M20x1.5 Conduit |
| | O | 0-5 Volt | 0-20 mA | M20x1.5 Conduit |
| | P | 4-20 mA | 0-5 Volt | M20x1.5 Conduit |
| | Q | 0-20 mA | 0-5 Volt | M20x1.5 Conduit |
| | R | 1-5 Volt | 1-5 Volt | PG11 Cable Gland |
| | S | 0-20 mA | 0-20 mA | PG11 Cable Gland |
| | T | 1-5 Volt | 1-5 Volt | 1/2" NPT (F) Conduit |
| | U | 0-20 mA | 0-20 mA | 1/2" NPT (F) Conduit |
| | V | 0-5 Volt | 0-5 Volt | M20x1.5 Conduit |
| | W | 1-5 Volt | 1-5 Volt | M20x1.5 Conduit |
| | X | 0-20 mA | 0-20 mA | M20x1.5 Conduit |
| | Y | 4-20 mA | 0-5 Volt | M20x1.5 Conduit |
| Z | 0-20 mA | 0-5 Volt | PG11 Cable Gland | |
| 5 | 0-5 Volt | 0-5 Volt | 1/2" NPT (F) Conduit | |
| 6 | 0-5 Volt | 0-20 mA | 1/2" NPT (F) Conduit | |
| 7 | 4-20 mA | 0-5 Volt | 1/2" NPT (F) Conduit | |
| 8 | 0-20 mA | 0-5 Volt | 1/2" NPT (F) Conduit | |
| XI. Power Supply Inputs | 1 | ±15 Vdc | | |
| | 2 | 24 Vdc | | |
| XII. Output Enhancements | A | Standard response | | |
| | B | Fast response | | |
| XIII. Certification | 1 | Safe Area | | |

Sample Standard Model Code

| I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | XIII |
|-----|----|-----|----|---|----|-----|------|----|---|----|-----|------|
| SLA | MF | 5 | 0 | S | 1A | A | B | 1 | E | 1 | A | 1 |

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