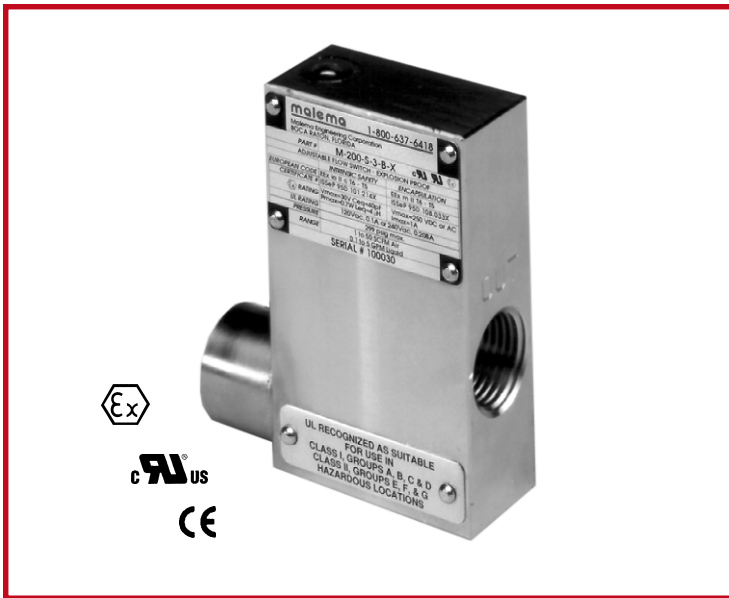


Adjustable Flow Switches



M-200X Series

Explosion proof,
adjustable flow switch
with right-angle flow

Features

- Field adjustable – infinite flow range
- High repeatability
- Extremely sensitive
- Low pressure drop
- UL recognized for hazardous locations
- Cenelec certified for intrinsic safety and encapsulation
- Community Europe compliant
- Position insensitive

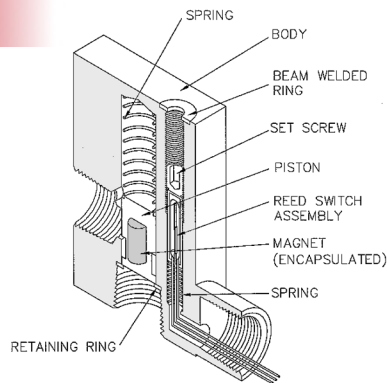
Applications

- Gas and liquid analyzers
- Biomedical instruments
- Atmosphere furnaces
- Fire control systems
- Cooling systems

The M-200X Series flow switches are engineered and field tested for sensing increasing and decreasing flow rates of gases or liquids. Pressure variation effects are minimal. This series features such versatility, economy, and accuracy that they can be used in virtually any application requiring fool-proof inexpensive flow detection.

Operations

The flow switch is activated by flow forcing a piston kept in place by a spring to travel past a reed switch. This provides a positive signal after a certain amount of travel. Set point adjustment is controlled by adjusting the positioning of the reed switch.



Illustrated is the M-200X-S
Model with 1/2" ports.

Calibration Range *

3/8", 1/2", SAE8:	Water: 0.03 - 5 gpm
	Air: 1 - 50 scfm
3/4":	Water: 0.2 - 10 gpm
	Air: 2 - 100 scfm

* Maximum flows through switch are higher.
For higher flow settings, contact factory.

Specifications

Set Point Accuracy:	±10% maximum
Repeatability:	±2%
Hysteresis:	30%

Material Versions

- Brass
- 316 Stainless Steel
- PTFE

Port Sizes

- 3/8" FNPT
- 1/2" FNPT
- SAE8*
- 3/4" FNPT*

* 316SS only

Design Considerations / Construction

The M-200X Series comprises a Body, Piston, and Retaining Rings. Selecting a Flow Switch begins with selecting the body; this series is available in 316 Stainless Steel, Brass, or PTFE. The M-200X Series contains one moving part (i.e. the piston) and two retaining rings that are in the fluid path. Construction of the piston is important from a design perspective. We manufacture three types of pistons (it is critical to select the correct piston for your application): 316 Stainless Steel, PTFE Encapsulated, and Special All-Metal piston.

(1) The standard piston is a PTFE piston with epoxy to hold the magnet in place. This piston is recommended for non-aggressive fluids and inert gases. Stainless Steel retaining rings are typically used with this piston type.

(2) The second piston that is available is a PTFE Encapsulated one. This piston is a magnet that has PTFE molded around it and then machined to the appropriate configuration. These pistons are primarily used in PTFE flow switches and also in other flow switch bodies (typically 316SS and Acrylic bodies) where customers prefer a piston that does not have epoxy in the fluid path; as well as a piston that is impervious to aggressive fluids and gases. This piston is highly recommended for medical applications. Hysteresis on these pistons does tend to be slightly (10 to 15%) higher than metal pistons due to frictional effects and surface adhesion considerations. Prior to selecting this piston, fluid temperatures and fluid compatibility with PTFE must be taken into account because certain aggressive chemicals at specific temperatures tend to swell PTFE causing the piston to change shape resulting in failure of the product. Stainless or PTFE retaining rings can be used with this piston.

(3) The third piston that is available is a Special All-Metal piston (only available in 316SS). This piston is fabricated in a proprietary process with only one weld seam (leak tested) which presents an all 316SS surface to the fluid path. This piston is recommended for those applications where the piston could experience a lot of cycling wear. This piston has been tested to 250,000 cycles at 125 psi. Stainless Steel retaining rings are recommended for this piston type.

Standard Specifications by materials

Housing	Brass	316SS	PTFE
Piston*	PTFE	PTFE	PTFE
Spring	316SS		
Retaining Ring*	316SS	316SS	PTFE coated 316SS
Pressure and Temperature Specifications			
Maximum Operating(psig)	1,500	3,000	80
Burst(psig)	3,000	5,000	160
Maximum Operating Temperature	149 C / 300°F	149 C / 300°F	149 C / 300°F
Reed Switch Data (Electrical Ratings)			
Reed Switch	3 Watts (Hermetically Sealed) UL Recognized Operating Temperature -40 C to 125 C		
Switching Voltage	170 VDC		
Breakdown Voltage	200 VDC		
DC Resistive	3 Watts		
AC Resistive	3 VA		
Switching Current	0.25 VA		
Carrying Current	0.5 A		
Lead Wires	No. 24 to 18 AWG. 18" Length Polymeric UL Recognized		
Lead Wires Color	Green - Common, Yellow - Normally Closed, Orange - Normally Open		
Flow Calibration	(Higher accuracy units available)		
Set Point Accuracy	10% maximum		
Set Point Differential	30%		
Repeatability	+/- maximum		

* See "Design Considerations/Construction" above

Adjustable Flow Switches

Reed Switch Rating as Recognized by UL

SPST	120 VAC 24 VDC 50 VDC	0.1 A general purpose 0.25 A resistive 0.25 A resistive
SPDT	120 VAC 10VDC 24VDC	0.1 A general purpose 0.25 A resistive 0.1 A resistive

Installation & Maintenance

The standard switch can be mounted in any orientation. Adequate filtration and sealing procedures should be used when mounting in flow lines. For detailed directions, please refer to our "Installation and Maintenance" sheet.

Certifications

- UL and Canadian UL Recognized for use in Class I (Groups C & D) and Class II (Groups E, F, & G), all divisions, hazardous locations. File E153446.
- Certified by ISSeP as found to comply with the harmonized standards, with relevant amendments, for Encapsulation and Intrinsic Safety: EN 50014 (1977), EN 50020 (1977), and EN 50028 (1987). Intrinsic Safety: European Code – EEx ia II T6-T5; Certificate Number – ISSeP 95D.101.214 X. Encapsulation: European Code – EEx m II T6-T5; Certificate Number – ISSeP 95D.108.033 X.
- Meet the intent of Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/EEC for Product Safety. Compliance was demonstrated to the following specifications as listed in the Official Journal of the European Communities: EMC Directive 89/336/EEC: EN 55011, Class B Radiated Emissions, EN 50082-1 (Immunity); IEC 801-2, Electrostatic Discharge Immunity, IEC 801-3, RF Electromagnetic Field Immunity; Low Voltage Directive 73/23/EEC: EN 61010-1, Safety Requirements for electrical equipment for measurement, control, and laboratory use.

Cv

3/8" FNPT: Cv = 3.0

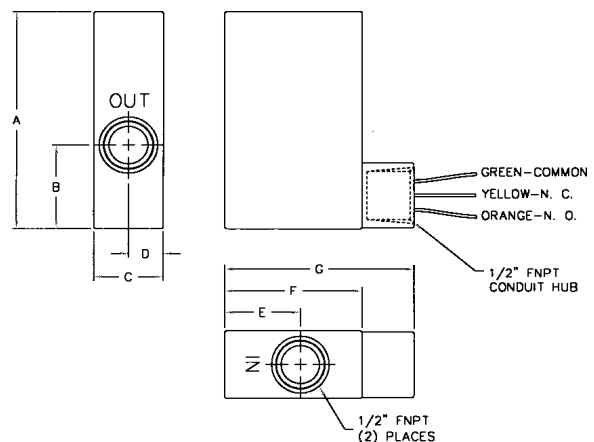
1/2" FNPT: Cv = 3.5

3/4" FNPT: Cv = 9.4

Dimensional Drawing

316 Stainless Steel M-200X Model

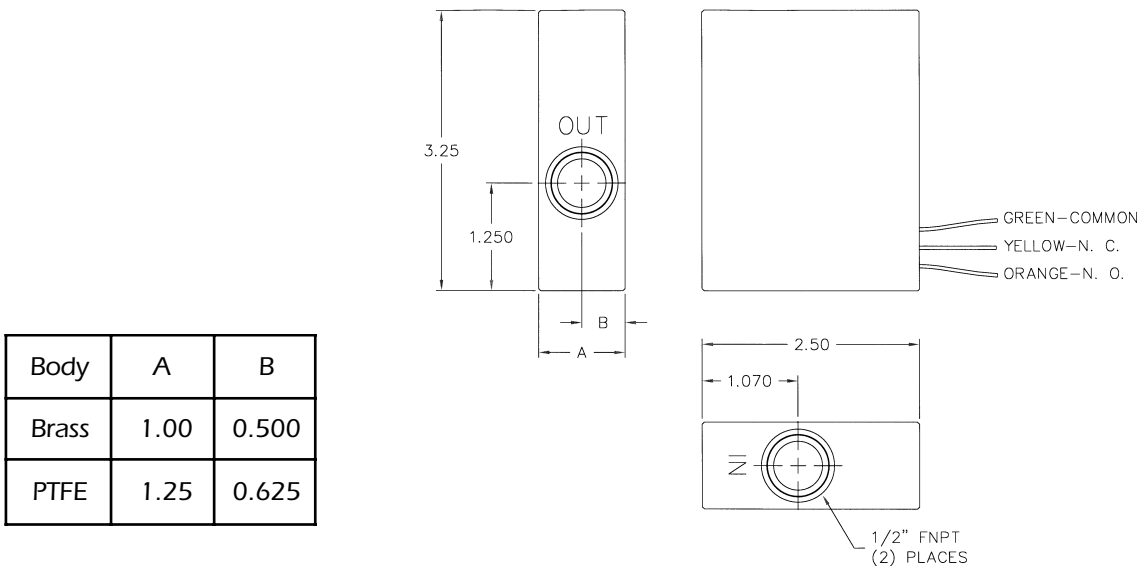
Port Size	A	B	C	D	E	F	G
3/8"	3.25	1.250	1.00	0.500	1.070	2.75	3.50
1/2"	3.25	1.250	1.00	0.500	1.070	2.75	3.50
SAE8	3.37	1.370	1.25	0.625	1.240	2.25	2.97
3/4"	3.50	1.250	1.25	0.625	1.320	2.30	3.05



M-200X Series

Dimensional & Cut-Away Drawings

Illustrated is the Brass & PTFE M-200X Model



Adjustable Flow Switches

Factory Preset Information

The M-200X is an adjustable flow switch. The flow set point can be set at the factory, upon request. Proper calibration of the set point requires the following information. When purchasing a flow switch that needs to be factory preset, use the "Set Point Calibration" form on page i-vi or provide this information on the purchase order.

- Calibration set point,
- Increasing or decreasing flow,
- Fluid type (i.e. liquid or gas),
- Density or specific gravity,
- Viscosity,
- System pressure and temperature,
- Flow direction (i.e. upward or downward), and
- Mounting orientation (i.e. horizontal or vertical).

Ordering Information

Standard Part Numbering						
M	-	Model	-	Material	Port	Switch
M	-	200X	-	S	3	3
		200X		B - Brass S - 316 Stainless T - PTFE	3 - 3/8" 4 - 1/2" *6 - 3/4"	3 - SPDT

* 316SS only