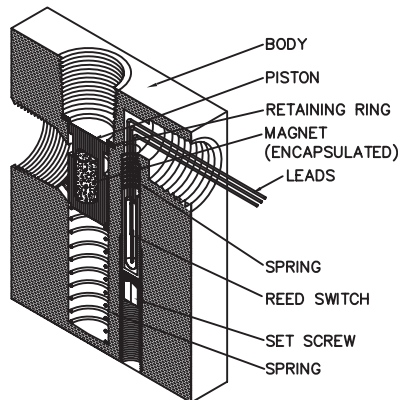


M-200X

Explosion Proof Adjustable Flow Switch with Right Angle Flow

Key Features

- Field adjustable
- Infinite flow range
- Extremely accurate and sensitive
- Low pressure drop
- UL recognized for hazardous location
- ATEX certified for intrinsic safety and encapsulation and dust environments
- Community Europe compliant
- Universal Mounting available



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

Description

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.

Operating Principle

The operating principle is based on a free floating magnetic piston which responds only to the motion of fluids within the line, not to static or system pressures. In the presence of fluid flow, controlled movement of the piston actuates an external hermetically sealed reed switch thus opening or closing the required signal circuit. This signal can be used to actuate audible or visual alarms as well as relays, or other controls. Piston travel is short which insures low hysteresis. Pressure drop across flowswitch varies from 0.035 to 2 psi (at maximum flowrates for air and liquid). Universal mounted units are outfitted with a spring which resets the piston. The spring is held in place using a perforated disc.

Applications

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

Material Specifications

Housing	316 SS
Endplug	316 SS
Piston	PTFE
Spring	316 SS
Retaining ring	316 SS

Please consult with the factory for any special requirements.
Other materials available upon request; only 316 SS is Cenelec Certified.

Operating Specifications

Pressure & Temperature	Maximum Operating Pressure	3,000 psig
	Burst Pressure	5,000 psig
	Maximum Operating Temperature	175°C (347°F)
Flow Calibration	Set Point Accuracy	± 10% maximum
	Hysteresis	30%
	Repeatability	± 2% maximum

See "Design Consideration/Construction" section

Calibration range

Air	2 - 100 scfm
Water	0.2 - 40 l/min

For lower and higher trip points contact factory. Maximum flow through switch is higher.

Port size

3/8" FNPT
1/2" FNPT
3/4" FNPT
SAE 8
SAE 12

Electrical Specifications

Reed Switch data (Electical Ratings)	10 Watts SPST or 3 Watts SPDT (Hermetically Sealed) UL Recognized. File E47258
Operating temperature	-40°C to 175°C
Switch voltage	200 Vdc (170 Vdc for SPDT)
Breakdown voltage	250 Vdc (200 Vdc for SPDT)
DC Resistive	10 VA (3 VA for SPDT)
AC Resistive	10 Watts (3 Watts for SPDT)
Switching current	0.5 A (0.25 A for SPDT)
Carrying current	1.2 A (0.5 A for SPDT)
Lead Wires	No 24 to 18 AWG. 18" length, Polymeric UL Recognized (Belden cable or special shielded cable is available)
Lead Wires Color	SPST: 2 blue wires SPDT: Green - Common, Yellow - Normally Closed, Orange - Normally Open

Reed Switch Ratings 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 10 Vdc 24 Vdc	0.1 A general purpose 0.25 A resistive 0.1 A resistive

Installation and Maintenance

This product 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.

Design Considerations / Construction

The M-200X Series comprises a body, piston, and retaining rings. Selecting a flowswitch begins with selecting the body; this series is available in 316 Stainless Steel. 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 316 Stainless Steel 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 PTFE Encapsulated. The piston is a magnet that has PTFE molded around it and then machined to the appropriate configuration. These pistons are primarily used where the customer prefers 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 higher (10 to 15%) than metal piston due to frictional effects, weight, 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 with no epoxy (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 for low pressure applications and an orifice disc (See Universal Mounting Diagram) is recommended for high pressure (125 psi) applications.

Adjustable Flow Setting Information

This model is an adjustable flow switch. The flow set point can be set at the factory, upon request. When purchasing a flow switch, use the “Flow Switch Application Sheet” or provide additional information on the purchase order to facilitate factory calibration of the set point.

- 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)
- Mounting orientation (i.e. horizontal or vertical)



Custom Version Available

Malema welcomes the opportunity to apply its flow sensor experience to work for its customers. Please contact us for any special requirements including ports, extreme temperature capabilities, extreme pressure capabilities, etc.

Certifications

- UL and Canadian UL Recognized for use in Class I (Groups A, B, C) and Class II (Groups E,F,G), all divisions, hazardous locations. File E153446.
- Atex Certifications for Encapsulation and Intrinsic Safety (Via ISSeP)
- IECEx Certifications for Encapsulation and Intrinsic Safety Protection (Via UL)

Intrinsic Safety (Via ISSeP)

Gases:  II 1 G Ex ia IIC T6...T3 Ga
 Dusts:  II 1 D Ex ia IIIC T95°C...T175°C Da

Electrical Parameters



$U_i \leq 30 \text{ V}$

$P_i \leq 0,7 \text{ W}$

$C_i = 40 \text{ pf}$

$L_i = 4 \text{ } \mu\text{H}$

Encapsulation (Via ISSeP)

Gases:  II 2 G Ex mb IIC T6...T3 Gb
 Dusts:  II 2 D Ex mb IIIC T95°C...T175°C Db

Electrical Parameters

$U_m = 250 \text{ V}$ and $I_m = 1 \text{ A}$

Ambient temperature range	Temperature class for Gas	Temperature class for Dust
- 40 °C to + 60 °C	T6	T95°C
- 40 °C to + 75 °C	T5	T95°C
- 40 °C to + 117 °C	T3	T140°C
- 40°C to + 149 °C	T3	T175°C

-EX ia:

EN 60079-0 : 2012 (IEC 60079-0 : 2011)
 EN 60079-11 : 2012 (IEC 60079-11 : 2011)
 EN 60079-26 : 2007 (IEC 60079-26 : 2006)

CE Mark

EMC (EMC directive 2004/108/EC)

EN 61326-1:2006
 EN 61000-4-2:1995/A1:1998/A2:2001
 EN 61000-4-3:2006
 EN 61000-4-4:2004
 EN 61000-4-6 :2007
 EN 61000-4-8 :1994/A1:2001

Safety (Low-voltage Directive 2006/95/EC)

EN 61010-1:2001

-EX mb:

EN 60079-0 : 2012 (IEC 60079-0 : 2011)
 EN 60079-18 : 2009 (IEC 60079-18 : 2009)

IECEx

Intrinsic safety

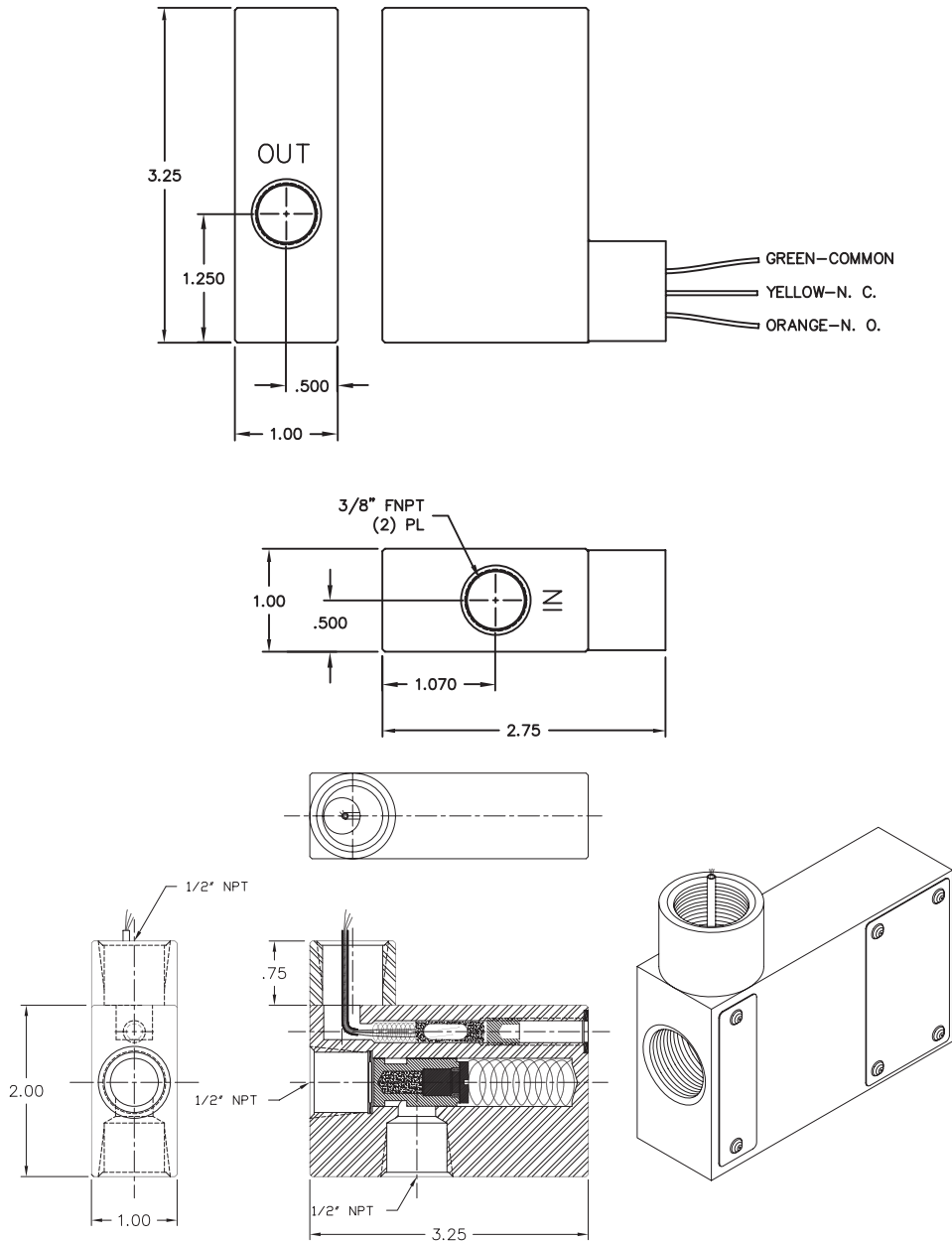
IECEx cert # : UL 13.0065X
 Code : Ex ia IIC T6, Ex ia IIIC T80°C Da

Encapsulation safety

IECEx cert # : IECEx UL 13.0067X
 Code : Ex mb IIC T6 Gb, Ex mb IIIC T80°C Db

Cut Dimensional Drawings

Illustrated are the M-200X model with 3/8" ports and SPDT switch (above) and the M-200X model with 1/2" ports and SPDT switch (below). For Reference Only



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

Body	A	B
316 SS	1.00	0.500

Ordering Information

Model Ordering Code							Option
M-200X	-	*	*	*	-	***	
	-						
Material		S					316SS
Fluid Connection			3				3/8" FNPT
			4				1/2" FNPT
			6				3/4" FNPT
Switch			3				SPDT
					-	XXX	Unique PN Identifier

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