MALEMA™

M-50/55/60 Series

Fixed setting flow switch with in-line flow

Operating Instructions

and

Quick Start Guide

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Introduction

The M-50/55/60 low flow, flow switches monitor increasing and decreasing flow. They utilize a single moving part which responds to fluid (liquid or gas) flowing within a system. These switches are suitable for a wide range of applications in industrial, biomedical, and OEM products. The flow monitors operate only when fluid flow is positively established.

Operation

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 producing the required signal. This signal can be used to actuate audible or visual alarms as well as relays, or other control. Piston travel is short which insures low hysteresis. Pressure drop across flow switch varies from 0.035 to 2 psi (at maximum flow rates for air and for liquid). Universal mounted units are outfitted with a spring which resets the piston. The spring is held in place using an orifice disc.

Storage and Handling

Storage conditions

Store the product under packed condition in an anti-static bag. The storage place shall be free from moisture, mechanical shock and vibration. The ambient temperature shall be between 0°C and 60°C and the humidity between 5% and 80% R.H. without condensation.

Unpacking and Product Inspection

On delivery, check the product for damage. Confirm that the model code on the label matches the specification in the purchase order.

Installation Instructions

The standard switch has to be mounted vertically in the position for normally open conditions and inverted position for normally closed conditions. When inverted, the switch set-point will change by ±5%; please use the product in the orientation it was calibrated (as indicated by reading the label). Universal units can be mounted horizontally or vertically. Please advise mounting orientation while ordering, so that the factory can calibrate in the required orientation as calibration does change slightly when changing orientation. Adequate filtration and sealing procedures should be used when mounting in flow lines.

Construction

The M-50/55/60 Series comprises a Body, Piston, and Retaining Rings. Selecting a Flow Switch begins with selecting the body. This 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 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 higher (10 to 15%) than metal pistons 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 on page 2-4) is recommended for high pressure (125 psi) applications.

Specifications

Housing	Acrylic	Aluminium	Brass	316SS	PTFE
Piston	316SS				PTFE
Orifice Plate or disc	316SS				PTFE
Spring	316SS				N/A
Retaining Ring	Stainless Steel (PH 15-7 MO, AMS 5520, AISI-632) (Passivated)				PTFE
Pressure and Temperature Specifications Maximum Operating (psig) Burst (psig) Maximum Operating Temperature	200 400 77°C (170°F)	1,000 3,000 149°C (300°F)	1,500 3,000 149 C (300°F)	3,000 5,000 149 C (300°F)	80 160 104 C (220°F)
Flow calibration Set point Accuracy Set point Differential(Deadband) Repeatability	(Higher accuracy units available) 10% maximum 15% ± 2 maximum				
Reed Switch Data (Electrical Ratings) Reed Switch Switching Voltage Breakdown Voltage DC Resistive AC Resistive Switching Current	10 Watts SPST or 3 Watts SPDT (Hermetically Sealed) UL Recognized. File E47258 Operating temperature -40°C to 125°C 200 VDC (170 VDC for SPDT) 250 VDC (200 VDC for SPDT) 10 VA (3 VA for SPDT) 10 Watts (3 Watts for SPDT) 0.5 A (0.25 A for SPDT) 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				

CONTACT ARRANGEMENT

Electrical Color Coding

SPST	2 Blue Wires
SPDT	Orange -Normally Open Yellow - Normally Closed Green - Common

Certifications

UL Recognised

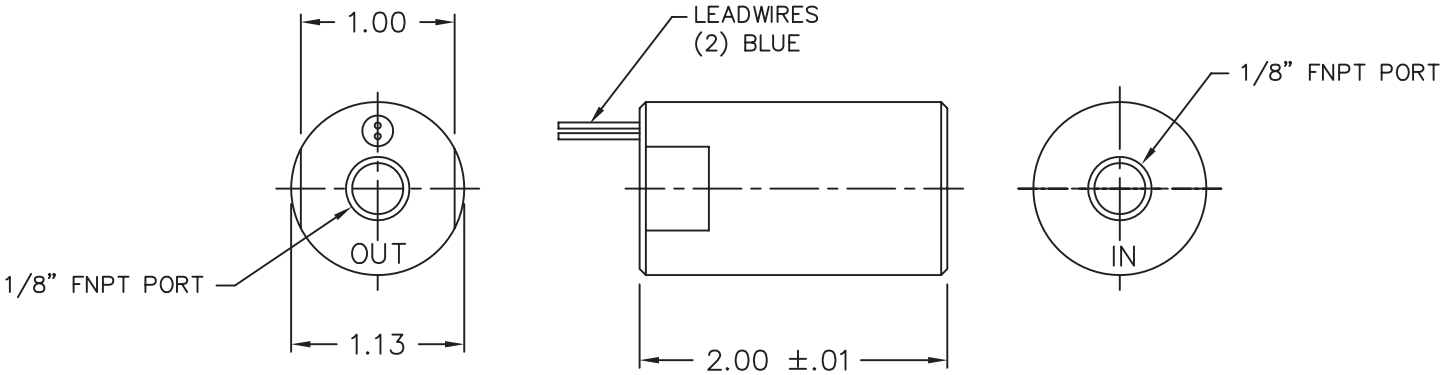
UL Recognised for Non Hazardous location – UL 138467

CE Compliance

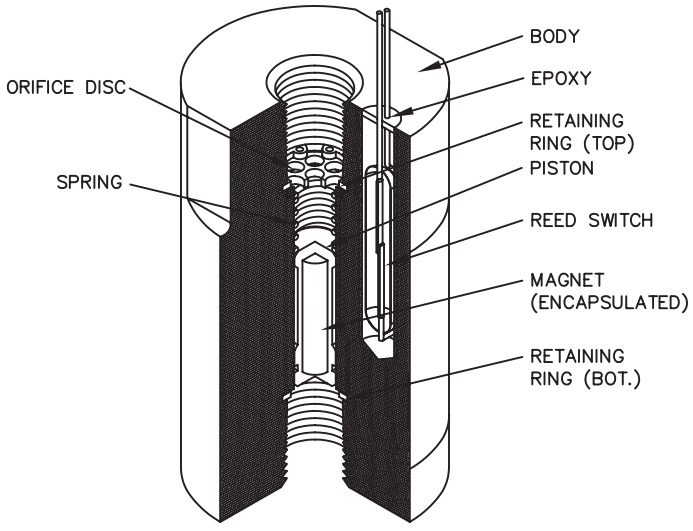
Malema flow switches meets CE compliance under LVD 2014/35/EU. RoHS and REACH can be obtained from Malema on request.

Dimensional and Cut-Away drawings

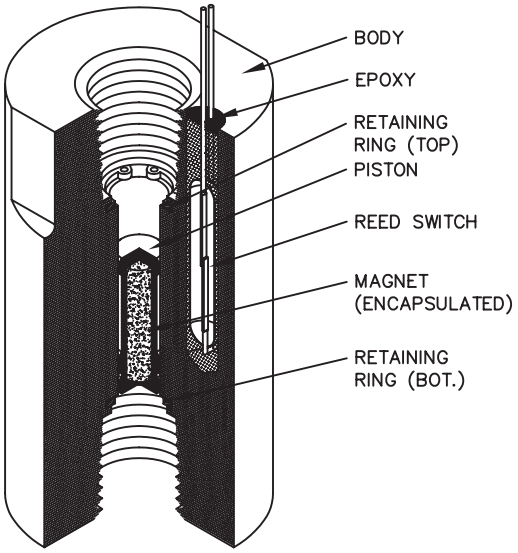
Illustrated is the M-50/55 Model with 1/8” ports.



Illustrated is the M-50 Model with 1/8” ports and universal mounting.



Illustrated is the M-50 Model with 1/4” ports.



Fixed Flow Setting Information

This model is a FIXED flow switch. The flow set point is fixed at the factory and is NOT field adjustable. Proper calibration of the set point requires the following information. When purchasing a flow switch, 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							Options		
M	**-**	**Model**	**-**	**Material**	**Port**	**Switch**	**-**	**Mounting**	**Piston**
M	-	50	-	S	1	1	-	0	0
		50 55		A - Aluminum B - Brass P - Acrylic S - 316 Stainless T - PTFE	1 - 1/8" 2 - 1/4"	1 - SPST N.O. 2 - SPST N.C. 3 - SPDT 4 - DS (Two SPST)		0 - Standard (Vertical) 1 - Universal Mounting (with disc and spring)	0 - Standard* (316SS with epoxy) 1 - PTFE encapsulated 2 - All-316 SS (no epoxy)

* The standard piston on the PTFE version is PTFE encapsulated.

Note: The flow switch performance will be affected in the vicinity of Magnets, Electromagnets, and Ferrous metals. Hence adequate protection should be provided while installing in close proximity to such interferences or relocate the flow switch away from them appropriately.

Warranty

Malema Sensors warrants to the buyer that its products are free from defects in materials and workmanship at the time of shipment and during the WARRANTY PERIOD. Malema Sensors obligation under this warranty is limited to the replacement of the product(s) by same product(s) manufactured by Malema Sensors or repair of the product(s) at the Malema Sensors facility. Malema Sensors products are sold with the understanding that the buyer has determined the applicability of the product(s) to its intended use. It is the responsibility of the buyer to verify acceptability of performance to the actual conditions of use. Performance may vary depending upon these actual conditions.

Warranty Period

This warranty is in effect for twelve (12) months from the date of shipment from Malema Sensors place of business.

Warranty Claim

If Malema Sensors products are found to be defective in materials or workmanship within twelve (12) months of the date of shipment, they will be repaired or replaced with same product at the discretion of Malema Sensors at its place of business at no charge to the buyer.

Service and Repair

To return the products, please obtain an RMA number for the product by contacting Malema Sensors (Corporate Office), Boca Raton at (800) 637-6418 or (561)995-0595.

All returns of equipment must go to the following address:
Malema Sensors,
1060 S Rogers Circle
Boca Raton, FL 33487, USA

NOTE: Specifications are subject to change without notice.