



FLO-CORP.com

# FLOSENTINEL™ MFFL

Adjustable Flow Switch for Liquids or Gases

## OPERATING INSTRUCTIONS



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## INTRODUCTION

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Please read this instruction manual before installation and start up! Pay particular attention to the safety precautions and operating limits. MEMFlo FloSentinel Flow Switches are designed for industrial environments, and taking a few moments to review the instructions assures long, trouble-free service.

## BASIC OPERATION

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MEMFlo's FloSentinel Flow Switches use only one moving part without springs, vanes, or mechanical linkages, and no electrical circuitry in the media. A magnetic linkage between an internal float and external, hermetically sealed reed switch assures precise, reliable function. In operation, the fluid being monitored enters the inlet port vertically, flowing into the control tube assembly. With sufficient flow rates, the fluid displaces the float upward, closing the external reed switch. The displaced float "uncovers" flow relief ports, minimizing pressure drop even at flows much greater than the switch adjustment range of the FloSentinel. Most typical applications call for the switch to be operated at high flows, keeping the float displaced and actuating the reed switch.

Adjustment of the alarm trigger point is accomplished by simply rotating the top of the unit, changing the size of internal by-pass openings located below the magnetic float in the control tube assembly. In the fully closed position, even very low flows will displace the float, closing the switch. When open, some of the fluid by-passes the float, thus necessitating a higher flow rate to displace the float and trigger the switch. An external scale and pointer approximates the degree of the tube openings.

## FLOW SWITCH INSTALLATION

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MEMFlo FloSentinels are ready to install as-is from the factory. Simply remove the protective thread caps from the inlet and outlet ports, and install vertically (exact plumbness is not essential--if the unit appears vertical, that is generally adequate). In general, there are no special piping requirements, although restrictive valves or fittings with connection sizes different than the FloSentinel may affect accuracy slightly. Pipe should be cut to proper lengths to avoid stress on the flow switch body, and the proper pipe lubricant (avoid an excess that might lodge in the unit) used. Apply wrenches only on the outer rims of the connection ports. Avoid over tightening, and do not use wrenches on other portions of the flow switch.

**BE SURE TO OBSERVE PROPER SAFETY PRECAUTIONS BEFORE OPERATING THE SYSTEM. THE USER IS RESPONSIBLE FOR PROPER INSTALLATION AND WIRING.**

## SET POINT ADJUSTMENT

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By rotating the top of the unit, internal by-pass ports are opened or closed, changing the flow rate required to displace the float which actuates the switch. An external scale and pointer shows the user the relative flow rate required for switch actuation. The "MIN." or "0" setting indicates that the by-pass slots are fully closed, and the minimum flows cause switch actuation; likewise, the "MAX." or "100%" point has the slots at maximum opening approximating the highest flows. Scale points between these two extremes provide the user a means of approximating other flow points within the range of settings. Scales are merely a reference allowing the user to repeat settings or show relative position. The scales are not calibrated for specific flows.

To adjust, loosen the side screw on the adjustment cylinder (loosen only enough to allow rotation--do not retract from groove), and simply rotate the cylinder assembly of the FloSentinel **BY HAND ONLY**, using the pointer and scale to indicate relative settings. The top switch block can remain connected to the conduit or junction box--the adjustment cylinder is designed to rotate without disconnecting the electrical hardware. Depending on system pressure, it may be necessary to shut off the system vent pressure to allow rotation. Do not use a wrench or pliers on the flow switch top to force rotation, as damage is likely! If a specific flow setting is required, MEMFlo can supply FloSentinels preset at additional cost.

Once the proper setting is established, tighten the side screw on the adjustment cylinder, which "relocks" the switch block.

## MAINTENANCE

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Other than occasional cleaning of the internal components, no other maintenance should be required. Frequency of cleaning depends on the service. Generally, once a year is adequate for most service. Generally, once a year is adequate for most applications involving relatively clean fluids. It is not necessary to remove the FloSentinel from the pipeline to disassemble and perform maintenance.

**CAUTION: SHUT OFF SYSTEM, VENT PRESSURE, AND DISCONNECT ELECTRICAL POWER TO THE FLOW SENTINEL BEFORE DISASSEMBLY. ALWAYS USE PROTECTIVE CLOTHING (SAFETY GLASSES, GLOVES, ETC.) WHEN WORKING ON SYSTEM COMPONENTS.**

The top assembly may be removed with or without the switch block. If you have wired the unit with flexible conduit, loosen the side screw and lift the switch block up and out of the unit. To remove the top assembly from the flow switch body, remove the cotter pins and lock rings. Using hands only, pull the top assembly up and out of the body with a slight twisting motion. Lift vertically, taking care not to damage internal surfaces or the tube assembly that comes out with the top assembly.

Carefully place the assembly on a clean, protective cloth. On some models, the screw or pin in the tube must be removed to remove the float assembly. On other units, both tubes come out with the top assembly, and the inner tube must be pulled out by hand. Do not use pliers on this tube!

Visually inspect all parts for damage. Parts may be washed in a mild detergent solution or solvent which is compatible with the materials of construction. A soft, non-metallic tube or bottle brush is recommended for cleaning the slotted tubes. Inspect the "O" ring seal (which may have stayed in the body) for any nicks or wear. Replace this "O" ring if damaged is suspected.

To reassemble, reverse the disassembly procedure. The "O" ring should be positioned on its seat on the top plug, not in the body. A little silicone grease or other lubricant compatible with the "O" ring and fluid being monitored should be applied to the ring. Carefully lower the top assembly into the body, aligning the pin or slot on the lower tube with the corresponding key or pin in the body. Using a slight rotation, press down on the top until the "O" ring seats in the body and the top is fully down. Make sure the pointer and scale are aligned. Replace the lock rings, cotter pins, and switch block.

## TROUBLESHOOTING

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### SWITCH REMAINS ACTUATED WITH NO FLOW:

Indicates the float is stuck or the reed switch is shorted or positioned improperly. If the former is suspected, disassemble and clean the unit.

If the float is moving freely but the reed switch is still closed, remove the switch block assembly. Switch closure when the block is removed indicates the switch has shorted, probably the result of too much current. The entire screw holder-reed switch assembly (A-1617) should be replaced.

If the switch opens upon removal of the switch block, the reed is being actuated by the magnet. Remove the entire upper assembly, and insert Setting Toll A-1619 into the tubes, over the float pin, displacing the float partially. Slowly loosen the large brass screw holder from which the switch wires exit--this screw is held by Loctite, and may not release easily. Loosening this screw will raise the switch until it deactuates (it is recommended that power is disconnected and an ohmmeter used for this test). Lower the switch until it just fires, and test that it opens again upon lowering the float with the setting tool. If it works correctly, squirt some Loctite down into where the switch screw enters the assembly.

TOP PLUG WILL NOT ROTATE (EVEN WITH SYSTEM DE-PRESSURIZED): Usually indicates the unit requires cleaning. Disassemble and clean all components, particularly the slotted tubes which should be free of any nicks or burrs. Check to make sure the inner tube rotates easily within the outer, turning by hand. If the top plug still will not rotate after cleaning and reassembly, return to Flow Line Options for inspection.

SWITCH WILL NOT ACTUATE: Disconnect power and remove the switch block. Using an ohmmeter, check reed switch function by moving a magnet close to the switch block assembly bottom, and then pulling it away. If the switch does not open and close in response to the magnet, replace the switch. If it does function,, replace the reed switch block in the top

# REPLACEMENT PARTS

Generally, there should be no need to stock replacement parts. However, it may be wise to order spare screw holder-reed switch assemblies (A-1617) and "O" rings ahead of time to avoid service interruption when replacements are needed (Flow Line Options does stock these parts).

There are no special storage requirements beyond keeping the units in reasonably clean areas away from excessive heat or corrosive vapors or solvents.

# SPECIFICATIONS

**Wetted Construction:** T316 stainless steel.

**Connections:** 3/4" FPT

**Switch Type:** Normally open, Form A reed switch standard. Hermetically sealed and intrinsically safe.

**Maximum Electrical Ratings:** 120VAC and 100VDC, 10W, (use Ohm's Law to calculate current rating for application voltage).

**Electrical Accessories:** Separately enclosed SPDT relay with surge suppressor.

**Maximum Set Point Differential:** 20% of rate (prevents rapid on-off cycling).

**Repeatability:** ± 1%

**Electrical Termination:** 6" wire leads, 1/2" NPT conduit connector.

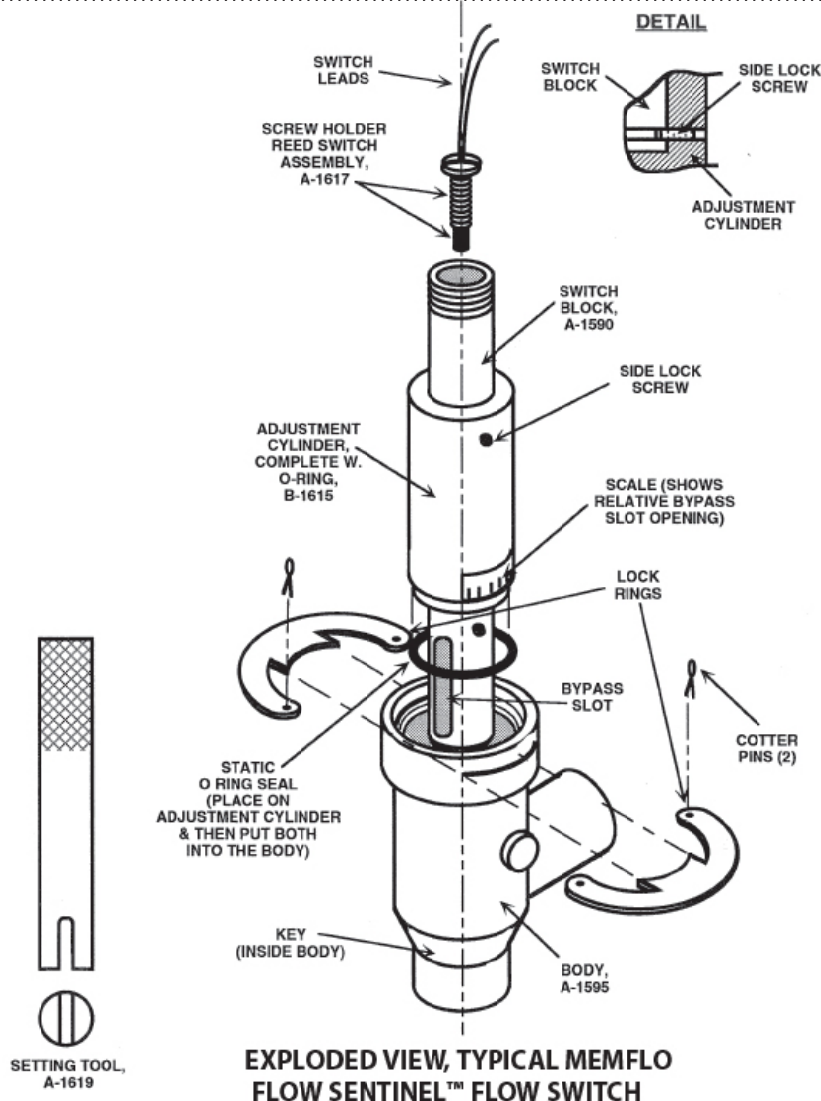
**Pressure Rating:** 300 PSIG to 130°F.

**Temperature Rating:** -20°F to +130°F

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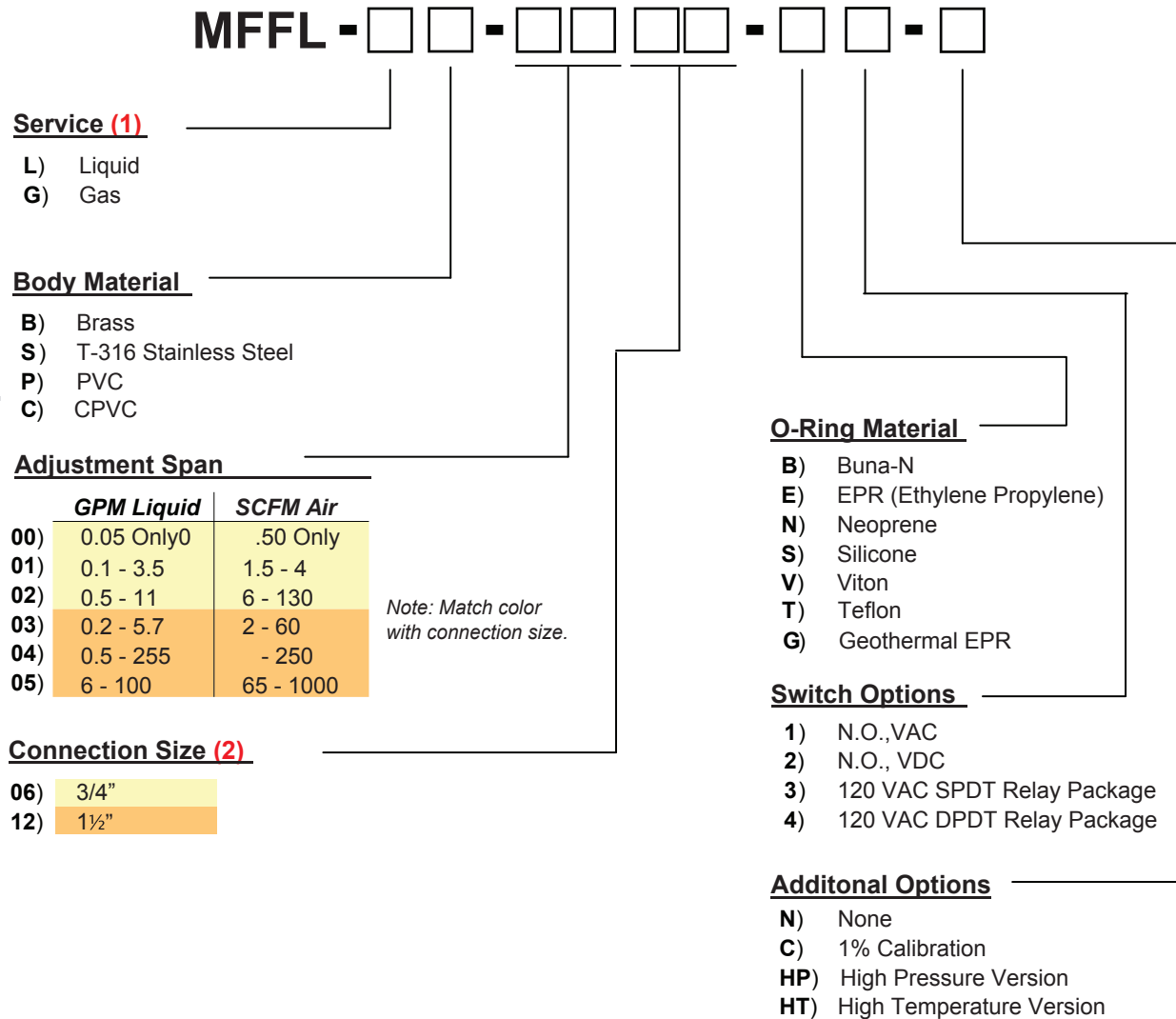
**EXPLODED VIEW, TYPICAL MEMFLO FLOW SENTINEL™ FLOW SWITCH**

# Ordering Information

## FLO-CORP MODEL NUMBER BUILDER

For Assistance Call 877-356-5463

Use the diagram below, working from left to right to construct your Flo-Corp Model Number.  
Simply match the category number to the corresponding box number.



### Ordering Notes

- 1) Select the best configuration based on your requirements.
- 2) Connection Size is based on Capacity - Colors must match to ensure compatibility.

