

# AMERITROL, INC.

## INSTALLATION OPERATION MANUAL AND WIRING DIAGRAM

### FM SERIES FLOW SWITCH

Manual Number: FM2010-0

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## OVERVIEW

The FM Series is an electronic flow switch designed to detect increasing or decreasing flow in virtually all liquids, gases, or slurries. Please refer to attached wiring diagram for program switch (SW1) settings.

- The flow switch factory default settings are configured for liquid flow and relay energized at flow.
- To change from factory default to air flow applications: Change program switch (SW1) position 1 to OFF.
- To change from factory default relay energization to relay energized at no flow: Change program switch (SW1) positions 3 to OFF and 4 to ON.
- Power input is written on the board.
- The relay rating is 3amps at 120 VAC.
- The FM series is intended for indoor general purpose applications. Our FX Series is available for outdoor, Nema 4X, and explosion proof applications.

## INSTALLATION

Install flow switch into process. Flow direction is not critical, and it is recommended the flats on the instrument nipple be parallel to flow in horizontal lines and perpendicular to flow in vertical lines.

Conduit Recommendation: Do not place flow switch at low point of conduit, because moisture can collect at the low point.

Insertion depth recommendations:

- The flow switch sensor head is extremely versatile in how it is mounted in the process line.
- Ideally at least a ¼" of sensor head probe is extended into the flow stream for a typical flow/no flow application.
- Top mounted liquid flow installations where the line can be partially full or contain entrained air may need special consideration. To keep the sensor probe immersed in product and improve performance, these applications may require more than ¼" of the probe to extend into the flow stream.

For mounting threaded units to process lines, it is recommended that:

A half-coupling, thread-a-let or the like be used. It is ideal for probes to extend into the line being monitored as discussed above.

If a pipe Tee is used, it is recommended that the leg used to mount the flow switch be the same as the instrument size (1" MNPT typical). The standard length flow switch sensor (1.8" long) will fit in a 1-1/4" X 1-1/4" X 1" or larger Tee.

For liquid service, fill the process line so that the probe is surrounded by liquid.

See attached drawing for wiring details.

## **CALIBRATION**

Power the instrument and allow 1 minute for the sensor head to reach equilibrium.

### TO DETECT A DECREASE IN FLOW (FACTORY DEFAULT):

It is assumed that the user will have the relay energized at flow and will alarm (relay de-energize) on loss or decrease of flow. Please refer to attached wiring diagram for relay energization and program switch settings (SW1).

Flow product in the process line to the normal /expected rate for 1 minute.

Adjust the potentiometer (R15 on the wiring diagram) on the circuit board until the red LED changes state, as follows:

If the LED is on: Turn the potentiometer clockwise.

If the LED is off: Turn the potentiometer counterclockwise.

Typical backlash for the potentiometer is 1/8 turn.

Once the red LED on/off location is determined, turn the potentiometer in the LED “on” direction (counterclockwise), as follows:

- Air Flow Switch: 4 turns
- Organics/hydrocarbons Flow Switch: 2 turns
- Water Flow Switch: 1 turn

These turn numbers are typical and can be “fine tuned” as required.

### TO DETECT INCREASE IN FLOW:

It is assumed that the user will have the relay energized at no flow and will alarm (relay de-energize) on increase of flow. Please refer to attached wiring diagram for relay energization and program switch settings (SW1). For relay energized at no flow, change program switch positions 3 to OFF and 4 to ON.

Flow product in the process line to the normal condition for 1 minute. If zero flow rate is normal/expected, set with line full at zero flow.

Adjust the potentiometer (R15 on the wiring diagram) on the circuit board until the red LED changes state, as follows:

If the LED is on: Turn the potentiometer counterclockwise.

If the LED is off: Turn the potentiometer clockwise.

Typical backlash for the potentiometer is 1/8 turn.

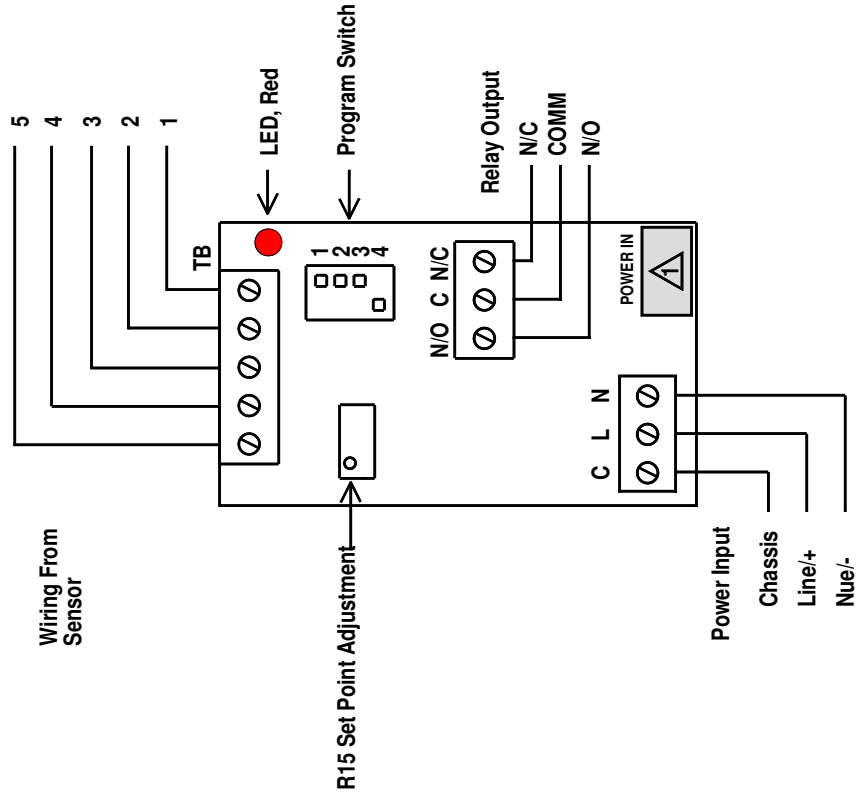
Once the red LED on/off location is determined, turn the potentiometer in the LED “on” direction (clockwise), as follows:

- Air flow switch: 4 turns
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- Water flow switch: 1 turn

These turn numbers are typical and can be “fine tuned” as required.

Technical service hours are Monday – Friday from 8:00 AM to 4:30 PM Pacific Standard Time

Terminal Number (TB)				
1	2	3	4	5
Integral Electronics	Red or Purple	Yellow	Black	Green
Remote Electronics	White	Blue + Drain	Black	Green
Type H Cable				



Application Settings Program Switch	Switch Position	Factory Default
Liquid Flow Switch	1 On	On
Air Flow Switch	2 Off	Off
Liquid Level Switch	3 Off	Off
Temperature Switch	4 Off	Off

Relay Energization Settings Program Switch	Switch Position	Factory Default
Flow Switch	3 Energized at Flow	On
	4 Energized at No Flow	Off

Relay Energization Settings Program Switch	Switch Position	Factory Default
Level Switch	3 Energized When Wet	On
	4 Energized When Dry	Off

**NOTES**

Power Input Written on Board

"120 VAC"	90-132 VAC, 4 Watts Max.
"12 VDC"	12 VDC +30%, -10% 300 mA
"24 VDC"	24 VAC or VDC ±10%, 4 Watts or 150 mA

**2. Relay Rating**

3 AMP Relay Rated at 120 VAC or 24 VDC Resistive and 2 AMP at 240 VAC
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**Flow Switch**  
Wiring Diagram, SPDT Relay Output, M Series Board

Size <b>A</b>	Drawn by <b>RAL</b>	Drawing No. <b>2010</b>	Rev <b>3</b>
Scale	Date <b>2/01</b>	Sheet	1 of 1