

AMERITROL, INC.

INSTALLATION OPERATION MANUAL AND WIRING DIAGRAM

FX SERIES FLOW SWITCH WITH ADDITIONAL TEMPERATURE TRANSMITTER

Manual Number: FXTT2110-1

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OVERVIEW

The FX Series is an electronic flow switch designed to detect increasing or decreasing flow in virtually all liquids, gases, or slurries. The additional temperature transmitter provides an industry standard loop powered linear 4-20 mA signal with a fixed range that is relative to temperature. Please refer to attached wiring diagram for DIP switch (SW1) and relay energization switch settings (S1).

- 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 DIP switch (SW1) positions 1 to OFF and 2 to ON.
- To change from factory default relay energization to relay energized at no flow: Reverse red slide switch (S1).
- Standard temperature transmitter range is 0 - 100 degrees C. Actual range is specified at order entry and is included in the part number (for example: ...TT0-100C at end of the part number corresponds to a 0 to 100 degree C temperature range).
- The loop powered 4-20 mA output for temperature requires a loop power range of 8-36 VDC.
- Power input and relay rating are written on the board.

INSTALLATION

Install flow switch/temperature transmitter 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. A conduit seal may be beneficial in preventing moisture from entering the enclosure and damaging the electronics.

Insertion depth recommendations:

- The flow switch/temperature transmitter 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 mounting flanged units, bolt holes will straddle the process line. Probe length ("U") is specified as the distance from the face of the flange to the tip of the probe.

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

See attached drawing for wiring details.

TEMPERATURE TRANSMITTER CALIBRATION

The transmitter is factory calibrated and fixed to the customer specified range and no calibration is necessary. The transmitter 4-20mA output is loop powered and can operate from 8-36 VDC.

FLOW SWITCH CALIBRATION

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

When removing housing cover, observe safety precautions associated with the area in which the unit is mounted.

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 switch setting.

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

Adjust the potentiometer (R22 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 setting. The relay energization switch (red slide switch: S1) will need to be changed from the factory default setting.

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 (R22 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.

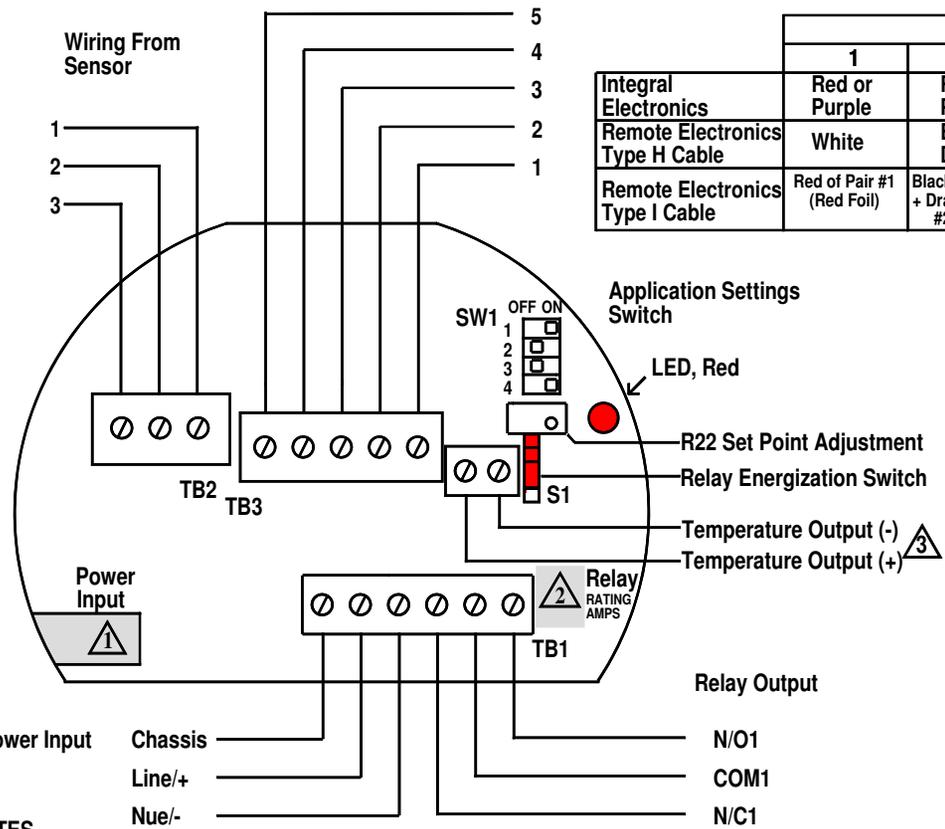
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Technical service hours are Monday – Friday from 8:00 AM to 4:30 PM Pacific Standard Time



	Terminal Number (TB3)				
	1	2	3	4	5
Integral Electronics	Red or Purple	Red or Purple	Yellow or White	Black	Green
Remote Electronics Type H Cable	White	Blue + Drain	Yellow	Black	Green
Remote Electronics Type I Cable	Red of Pair #1 (Red Foil)	Black of Pair #1 + Drain of Pairs #2 and #3	White of Pair #2 (Green Foil)	Black of Pairs #2 and #3	Green of Pair #3 (Blue Foil)

Terminal Number (TB2)		
1	2	3
Orange	Orange	Grey
N/A	N/A	N/A
Red	Red	White

Application Setting Switch	Switch Position				Factory Default
	1	2	3	4	
Liquid Flow Switch	ON	OFF	OFF	ON	
Air Flow Switch	OFF	ON	OFF	ON	
Liquid Level Switch	OFF	ON	OFF	ON	
Temperature Switch	OFF	OFF	ON	OFF	

Relay Energization Settings		Switch Position		Factory Default
Flow Switch	Level Switch	Temperature Switch		
Energized at Flow	Energized when Wet	Energized below Set Point	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Energized at No Flow	Energized when Dry	Energized above Set Point	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

NOTES

1 Power Input Written on Board

"120 VAC"	90-132 VAC, 4 Watts Max.
"12 VDC"	12 VDC +30%, -10% 300 mA
"24 VAC or VDC"	24 VAC or VDC ±10%, 4 Watts or 150 mA
"240 VAC"	200-240 VAC, 4 Watts Max.

2 Relay Rating Written on Board

"3"	3 AMP Relay Rated at 120 VAC or 24 VDC Resistive and 2 AMP at 240 VAC
"10"	10 AMP Relay Rated at 120 VAC or 24 VDC Resistive and 5 AMP at 240 VAC

3 Loop Powered 4-20 mA Output For Temperature, Loop Power 8-36 VDC

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Title **Flow Switch and Temperature Transmitter Wiring Diagram, SPDT Relay Output, X Series Board**

Size A	Drawn by RAL	Drawing No. 2110	Rev 1
Scale	Date 2/01	Sheet 1 of 1	