

Electronic Flow Switches

Industries

Petrochemical

Refining

Oil Production

Water Treatment

Pharmaceutical

Food and Beverage

Pulp and Paper

Power Production

Gas Processing

Mining

Biotechnology

Semiconductor

Ships/Marine

Defense Contractors

Pipelines



FX Series

Ameritrol, Inc.

Instruments and Controls

Features

- No Moving Parts
- 316L Stainless Steel Sensor
- Temperatures to 900F
- Pressures to 10,000 PSIG
- Field Programmable for Flow, Level and/or Temperature



Remote Mounted Electronics

- Explosion Proof Enclosures
- Low Flow Rate Detection
- Threaded, Flanged, Retractable Probes
- Exotic Alloys for Corrosion Resistance
- Reliable and Cost Effective



Extended Sensor Head

Pump Related Applications

- Low Flow Shutoff of Pumps
- Seal Water Leakage Detection
- Bearing Lubrication Monitor
- Cavitation Alarm
- Chemical Feeder Pump Sensor

General Applications

- Flow Indication/Verification
- HVAC Flow Sensor
- Tank Car Unloading
- Agitation Monitor in Tanks
- Rupture Disc/ Relief Valve Flow Monitor

Sensor Head

Material of Construction:	316L Stainless Steel Standard
Operating Temperature:	Optional Exotic Alloys -50 to 350F (-46 to 177C) Standard Option -100 to 900F (-73 to 482C) Option -320 to 500F (-196 to 260C)
Operating Pressure:	Vacuum to 4000 PSIG (275 Bar) Option to 10,000 PSIG (689 Bar)
Response Time:	From 3 Seconds
Repeatability	+/- 0.5% of Range at Constant Conditions
Process Connection:	3/4" MNPT, 1" MNPT Option Flanged, Retractable Probes, and 1-1/4", 1-1/2", 2", 3", 4" MNPT
Probe Length:	1.8", 1.2"; Option Customer Specified

Electronics

Housing:	Powder Coated Explosion Proof, UL/CSA Rated to Class 1, Div. 1 & 2, Group B,C,D; Class II, Div. 1 & 2, Group E,F,G; Class III. FM Option
Temperature:	-50 to 150F (-46 to 65C)
Power Input:	90-135 VAC, 50/60 Hz, 4 Watts Option 24 VDC/VAC, 200-240VAC
Relay Output:	SPDT 3 Amps Resistive Option DPDT and 10 Amps Res.
Electrical Connection:	1" FNPT
Shipping Weight:	5 lbs

Operation

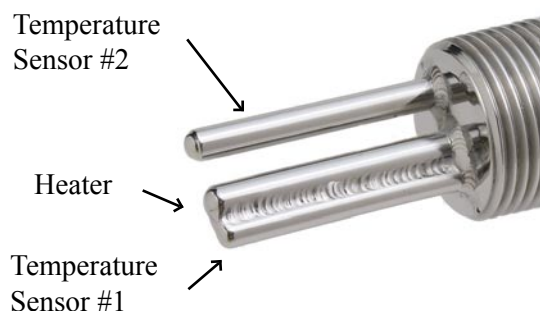
The FX series flow switch is the most reliable flow switch available. The thermal dispersion principle of operation features no moving parts and provides an extremely reliable and repeatable switch for the most demanding industrial applications.

The sensor head employs two temperature sensors with a constant very low power heating source physically attached to one of the temperature sensors. The second temperature sensor is isolated from the heating source and provides compensation for changing process temperatures (see figure 1). As flow changes so does the temperature differential. This allows the device to be used as a flow/no flow sensor and to be used to switch at any velocity shown in the flow switch range chart.

Extremely low flow rates can be detected with rangeability up to 300:1. These devices are ideal for use in virtually all liquids, gases, and slurries. The no moving parts principle of operation assures reliable and repeatable operation in extremely viscous products.

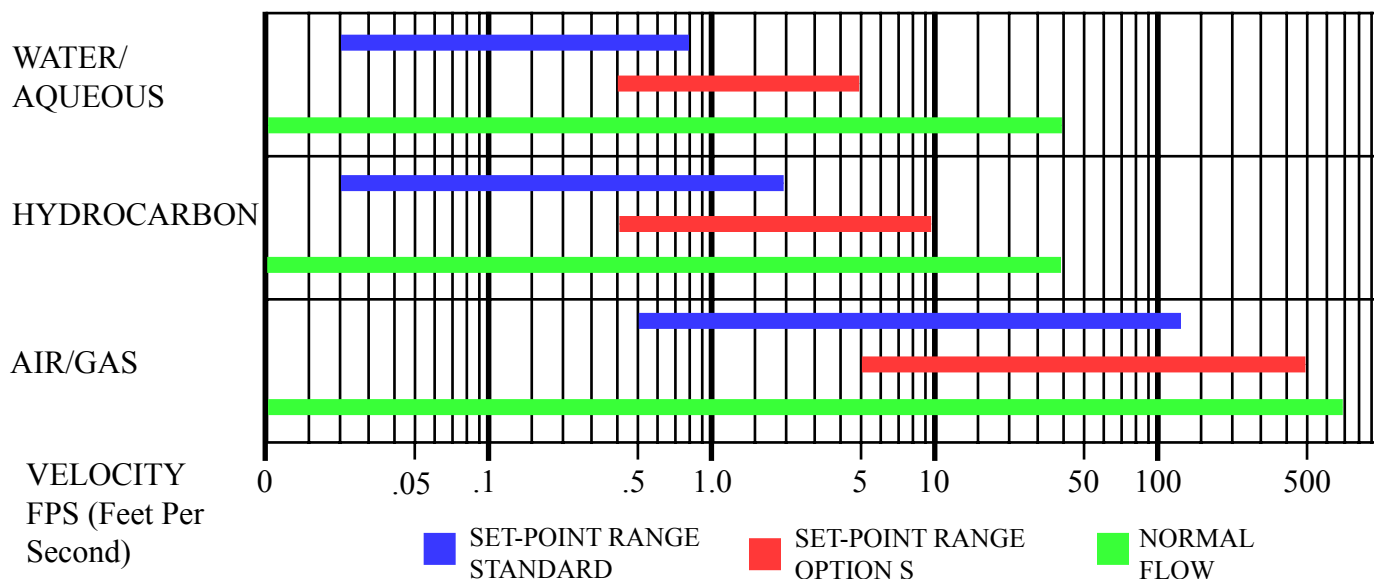
The electronics are available with single or dual switch points. The instrument can be easily field programmed to detect flow, level or temperature.

Relay outputs are standard and are offered with several different configurations and contact ratings. Remote mounting of the electronics is available.



Temperature Differential = Temperature Sensor #1 Minus Temperature Sensor #2

Figure 1



Conversion Table

Volumetric (GPM or CFM) to Velocity (Feet per Second - FPS)

Line Size	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1.25"	1.5"	2"	2.5"	3"	3.5"	4"	5"	6"
Liquid Multiplier	5.65	3.08	1.68	1.06	.602	.371	.215	.158	.096	.067	.0434	.0325	.0252	.0160	.0111
Air Multiplier	42.19	23.06	12.57	7.91	4.50	2.78	1.61	1.18	.716	.502	.325	.243	.188	.120	.083

Line Size	8"	10"	12"	14"	16"	18"	20"	24"
Liquid Multiplier	.0064	.00407	.00287	.00237	.00182	.00143	.00115	.000798
Air Multiplier	.0480	.0304	.0209	.0177	.0136	.0107	.00863	.00597

Examples:

- 1) 100 CFM in 3" Line = $100 \times .325 = 32.5$ FPS
- 2) 10 GPM in 3" Line = $10 \times .0434 = .434$ FPS

PART NUMBER/ ORDER ENTRY SPECIFICATION

FX SERIES FLOW SWITCH

FX -

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PROCESS CONNECTION THREADED

3/4" MNPT	0	7	5	0
1" MNPT	1	0	0	0
1-1/4" MNPT	1	2	5	0
1-1/2" MNPT	1	5	0	0
2" MNPT	2	0	0	0

PROCESS CONNECTION FLANGED

1" FLANGE	1	0
1-1/2" FLANGE	1	5
2" FLANGE	2	0
3" FLANGE	3	0
4" FLANGE	4	0
6" FLANGE	6	0

150# RATING	1
300# RATING	2
600# RATING	3
900# RATING	4
1500# RATING	5

RAISED FACE 316L SS	1
RAISED FACE CS	2
FLAT FACE 316L SS	3
FLAT FACE CS	4
SPECIAL	5

OPTIONS - NO ENTRY REQUIRED FOR BOXES WITH X

INSERTION LENGTH		
1.8" STANDARD		X
1.2"	1	2
SPECIAL - SPECIFY LENGTH IN INCHES		
POWER INPUT		
117 VAC (90-132VAC)		X
12 VDC (+30%, -10%)		B
24 VDC or VAC (+/- 10%)		D
200-240 VAC		E
PROCESS TEMPERATURE		
-50F TO +350F		X
-320F TO +500F		F
-100F TO + 900F		G
REMOTE ELECTRONICS		R
CABLE TYPE PVC (200F)		H
CABLE TYPE TEFLON (500F)		I
CABLE LENGTH FEET		
RELAY OUTPUTS		
SPDT 3 AMP RESISTIVE		X
SPDT 10 AMP RESISTIVE		J
DPDT 3 AMP RESISTIVE		K
DPDT 10 AMP RESISTIVE		L

DUAL SWITCH POINTS		
SPDT 3 AMP RESISTIVE		M
SPDT 10 AMP RESISTIVE		N
EXOTIC ALLOYS		
HASTELLOY B-2	A	B
HASTELLOY C-22	A	C
HASTELLOY C-276	A	D
MONEL	A	M
TITANIUM	A	T
CARPENTER 20	A	P
HOUSINGS		
UL APPROVED EXPLOSION PROOF		X
FM APPROVED EXPLOSION PROOF		P
CENELEC APPROVED		Q
HIGH FLOW OPTION - CLEAN LIQUIDS/ GASES 1" MNPT OR 1 1/2" FLANGE OR LARGER		S
HIGH PRESSURE OPTION 10,000 PSIG		U
RETRACTABLE PROBE 50 PSIG		V
RETRACTABLE PROBE 500 PSIG		W

Example: FX-1000
 FX Series flow switch with 1" MNPT process connection, 1.8" insertion length, 117 VAC power input, -50 to 350 process temperature, single switch point with 3 amp contact rating.

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