In-Line Electronic Flow Switches

IX Series

Ameritrol, Inc.
Instruments and Controls

Industries

Petrochemical

Refining

Oil Production

Water Treatment

Pharmaceutical

Food and Beverage

Pulp and Paper

Power Production

Gas Processing

Mining

Biotechnology

Semiconductor

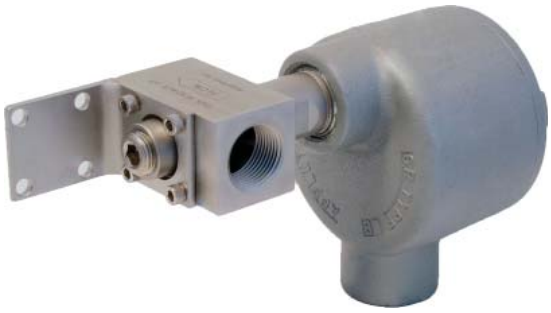
Ships/Marine

Defense Contractors

Pipelines

Features

- No Moving Parts
- 316L Stainless Steel, Optional Hastelloy C-276
- Temperatures to 350F
- Pressures to 10,000 PSIG
- Simple and Easy Field Calibration
- Explosion Proof Enclosures
- Low Flow Rate Detection
- Threaded or Flanged Connections
- Adapts to ⅛ Tubing thru ¾" Pipes
- Field Programmable for Relay Energization



IX-7575 with Optional
6 Way Mounting Bracket

IX-1875 or IX-2575

Optional GP Housing

Optional Remote Mounted Electronics

Sensor Head

Material of Construction:	316L Stainless Steel Standard Optional Hastelloy C-276
Operating Temperature:	-50 to +350F (-46 to +177C) Standard
Operating Pressure:	Vacuum to 2000 PSIG (138 Bar) Option to 10,000 PSIG (689 Bar)
Response Time:	From 1 Second
Repeatability:	± 0.5% of Range at Constant Conditions
Process Connection:	IX-7575: ¾" FNPT Inlet and Outlet IX-1875 & IX-2575: ¼" FNPT Inlet and ¾" FNPT Outlet, Options Available
Body Length:	2.5", 3.25" for IX-1875 & IX-2575, Customer Specified for Flanged Units

Electronics

Housing:	Powder Coated Explosion Proof, Nema 4X, UL/CSA Rated to Class 1, Div. 1 & 2, Group B,C,D; Class II, Div. 1 & 2, Group E,F,G; Class III. Option General Purpose (GP), FM and Cenelec/ATEX
Temperature:	-50 to +150F (-46 to +65C)
Power Input:	120 VAC, 50/60 Hz, 3 Watts; Options: 12 VDC, 24 VDC/VAC, 240VAC
Relay Output:	SPDT 3 Amps Resistive Standard See page 4 for options
Electrical Connection:	1" FNPT
Shipping Weight:	5 lbs

Operation

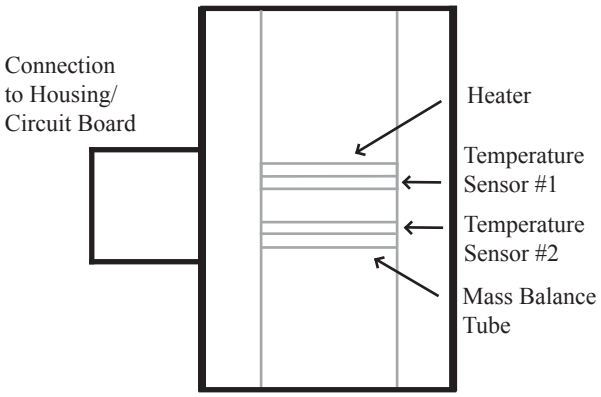
The IX series in-line flow switch is designed to easily adapt to line sizes from ⅛" tubing to ¾" pipe. Please refer to the FX series for larger line sizes. This switch offers an extremely reliable and repeatable instrument for industrial process control and features no moving parts exposed to the product being monitored.

The device operates by measuring a temperature differential between a heated and a reference temperature sensor. Within the body of the sensor head are the four tubes as shown in figure 1. The temperature differential is greatest at no flow and decreases as flow increases. This allows use in applications requiring a simple flow/no flow detection and for switch-points at a predetermined flow rate. Many different flow ranges are shown below in the set-point range chart. A conversion table is also provided to convert different engineering units.

Extremely low flow rates can be detected with a typical turn down ratio of 300:1. The principle of operation allows this flow switch to be used in practically all liquids, gases and slurries.

The electronics are available with single or dual switch points. Temperature monitoring is also available with either a switch output or a linear 4-20 mA output.

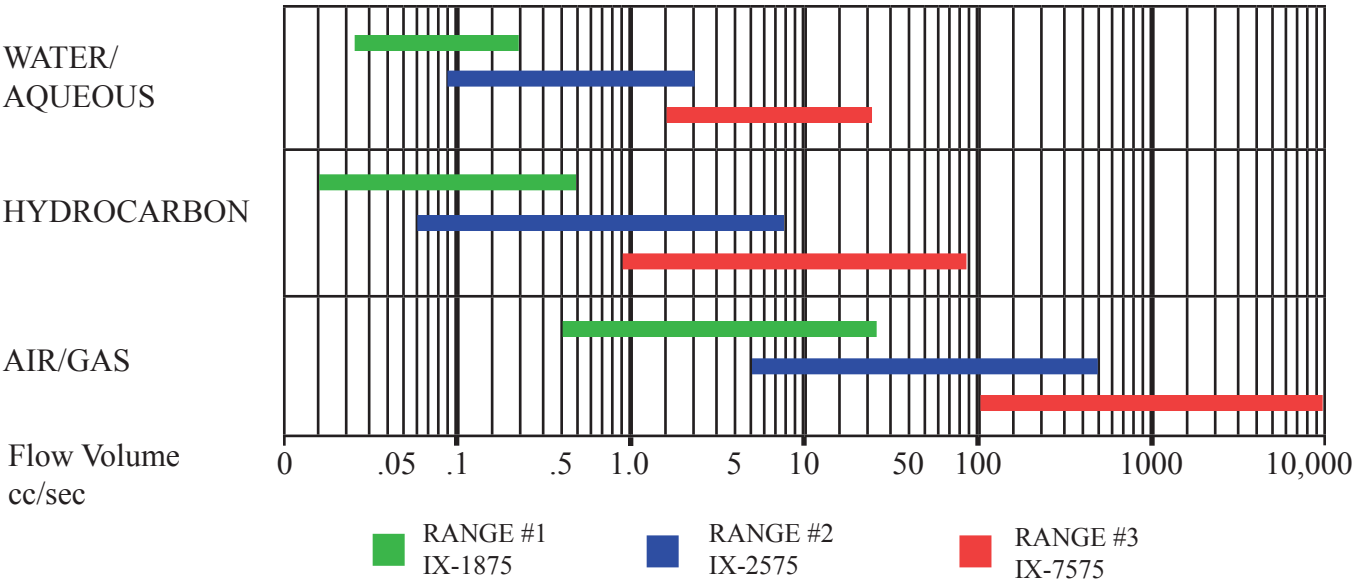
Relay outputs are standard and are offered with several different configurations and contact ratings. Remote mounting of the electronics is also available.



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

Figure 1

Flow Switch Set-Point Range



Conversion Table

Convert to cc/sec on above chart

FROM	MULTIPLY BY:	FROM	MULTIPLY BY:
GAL/MIN	63.1	LITERS/HR	0.278
GAL/HR	1.05	LITERS/DAY	0.0116
GAL/DAY	0.0438	CUBIC FT/MIN	471.95
LITERS/MIN	16.7	CUBIC MTR/HR	277.8

Example: To convert .5 GPM to cc/sec multiply .5 x 63.1 = 31.55 cc/sec.

Circuit Board Options

Standard Single Switch Point Electronics

• SPDT relay output with 3 or 10 amp contacts

• DPDT relay option with 3 or 10 amp contacts

• Wide selection of power inputs including 12 VDC, 24 VAC or VDC, 120 VAC, or 240 VAC

This circuit board is the standard used in the IX series flow switches. The electronics offer constant current sensor excitation, precision signal amplification, and highly repeatable switching circuitry for reliable operation in even the most demanding applications.

Optional Dual Switch point Electronics

• Two separately adjustable switch points

• SPDT relay output for each set point with 3 or 10 amp contacts

• Power inputs include 12 VDC, 24 VAC or VDC, 120 VAC, or 240 VAC

The optional dual switch point electronics provide two independently adjustable switch points that can be used to detect any two combinations of decreasing and/or increasing flow.

Single Switch Point Electronics with Additional Temperature Transmitter

• Temperature transmitter (3 wire 100 Ohm platinum RTD sensor) with loop powered 4-20 mA output

• SPDT relay output for flow switch with 3 or 10 amp contact rating

• Flow switch power inputs include 12 VDC, 24 VAC or VDC, 120 VAC, or 240 VAC

This option provides the user with a highly reliable flow switch with an accurate temperature transmitter. The temperature transmitter provides a industry standard linearized 4-20 mA signal. The temperature output is loop powered and can operate from 8-36 VDC.

Single Switch Point Electronics with Additional Temperature Switch

• Temperature switch point available from -50F to +350F, with options to 900F

• SPDT relay output for flow and temperature with 3 or 10 amp contact rating

• Customer specified power inputs include 12 VDC, 24 VAC or VDC, 120 VAC, or 240 VAC

This optional circuit board monitors two process variables, flow and temperature, with one instrument. Cost savings are realized by the user since the instrument has only one process connection and one conduit run. Applications include monitoring cooling water and all other applications shown on page 5 of this brochure.

Optional Calibrator

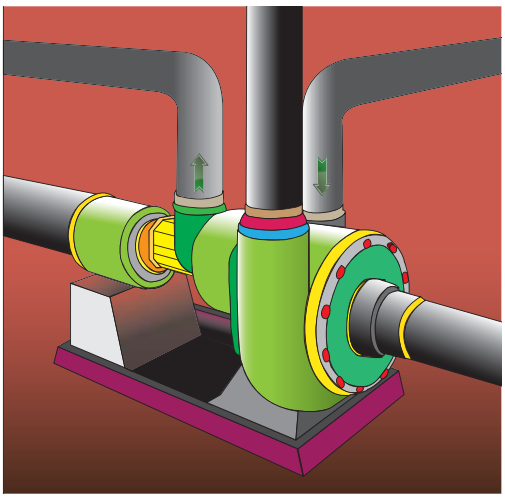
Flow Switch Calibrator Model MC-5

- Displays mV output which is proportional to flow
- Induces signal to electronics for setting specified switch point
- Allows periodic switch point verification

This tool is not needed for a vast majority of users. It is useful when a user has large quantity of units and requires periodic verification of switch point calibrations.

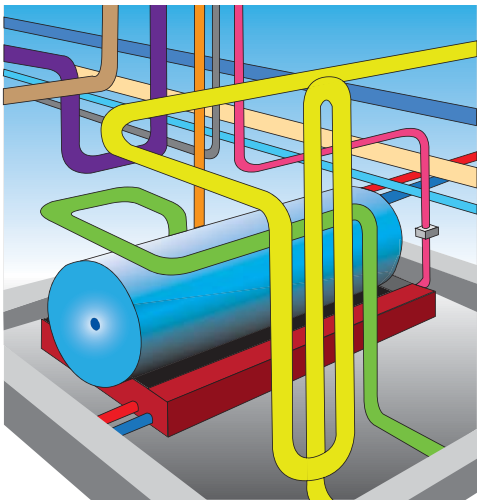
This easy to use hand held, self powered instrument can be used in conjunction with all single or dual switch point circuit boards. By simply plugging this instrument into the circuit board, the user can interrogate all functions of the flow switch.

Flow Switch Applications



- Pump Protection: Automatic shut down on low or no flow
- Bearing Lubrication: Detects loss of lubricant flow
- Seal Leakage: Verifies positive seal flow or detects excessive leakage indicating maintenance requirement
- Chemical Feed and Metering Pumps: Indicates low or no flow of chemical additives to process
- Safety Shower/Eye Wash Station: Automatic annunciation of potential danger to plant personnel
- Purge Air: Detects loss of flow for process or plant safety

- Analyzer/ Gas Chromatographs: Confirms continuous sample flow to instruments
- Spray Nozzles: Detects nozzle blockage in coating applications
- Heater Burnout Prevention: Heater shutdown on loss of flow to prevent overheating of elements
- Drain Line Sensor: Capable of detecting flow in partially filled lines
- Control Rooms: Verifies flow when fans, pumps or valves are energized



PART NUMBER/ ORDER ENTRY SPECIFICATION

IX SERIES IN-LINE FLOW SWITCH

OPTIONS - NO ENTRY REQUIRED FOR BOXES WITH X

PROCESS CONNECTION THREADED

IX - [ ][ ][ ][ ] - [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

1/4" FNPT INLET, 3/4" FNPT OUTLET, RANGE #1	1	8	7	5
1/4" FNPT INLET, 3/4" FNPT OUTLET, RANGE #2	2	5	7	5
3/4" INLET, 3/4" OUTLET, RANGE #3	**7**	**5**	**7**	**5**

PROCESS CONNECTION FLANGED

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

BODY LENGTH	
• 2.5" STANDARD IX-7575	X
• 3.25" STD IX-1875 & IX-2575	X
• OPTIONAL FLANGE 12" 1	2
• SPECIAL - SPECIFY LENGTH IN INCHES	
POWER INPUT	
• 117 VAC (90-132VAC)	X
• 12 VDC (-10%, +30%)	B
• 24 VDC (-10%, +20%) • 24 VAC (+/- 10%)	D
• 200-240 VAC	E
PROCESS TEMPERATURE	
•-50F TO +350F	X
REMOTE ELECTRONICS	R
• CABLE TYPE PVC (200F)	H
• CABLE TYPE TEFLON (500F)	I
• CABLE LENGTH FT.	
RELAY OUTPUTS	
• SPDT 3 AMP RESISTIVE	X
• SPDT 10 AMP RESISTIVE	J
• DPDT 3 AMP RESISTIVE ①②	K
• DPDT 10 AMP RESISTIVE ①②	L

DUAL SWITCH POINTS ①②	
• SPDT 3 AMP RESISTIVE	M
• SPDT 10 AMP RESISTIVE	N
ADDITIONAL TEMPERATURE SWITCH ①②	
• SPDT 3 AMP RESISTIVE T	1
• SPDT 10 AMP RESISTIVE T	2
ADDITIONAL TEMPERATURE TRANSMITTER ①②	
• MEASURED TEMPERATURE RANGE T T [ ] - [ ]	
• FAHRENHEIT (F) OR CELSIUS (C)	
EXOTIC ALLOYS	
• HASTELLOY C-276 A	D
HOUSINGS	
• UL APPROVED EXPLOSION PROOF	X
• FM APPROVED EXPLOSION PROOF	P
• CENELEC/ATEX APPROVED	Q
• GENERAL PURPOSE	Y
STAINLESS STEEL TAG	T
HIGH PRESSURE OPTION 10,000 PSIG	U
MILLIVOLT OUTPUT m	V
OPTIONAL 6 WAY MOUNTING BRACKET M	B

Notes:
① Only one of these options can be selected
② Not available with general purpose housing (option Y)

Example: IX-2575
IX Series flow switch with 1/4" inlet and 3/4" outlet process connection, 3.25" body length, 117 VAC power input, -50 to +350 process temperature, single switch point with SPDT 3 amp contact rating.

Example: IX-7575-DRH10L
IX Series flow switch with 3/4" inlet and outlet process connection, 2.5" body length, 24 VDC or VAC power input, -50 to +350 process temperature, remote electronics, 10' PVC cable, single switch point with DPDT 10 amp contact rating.

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