

# FS10A Analyzer Flow Switch / Monitor

**FCI** FLUID COMPONENTS  
INTERNATIONAL LLC

## For Process Analyzers and Sample Handling Systems



The FS10A is a universal flow monitor and switch specifically designed for gas and liquid process analyzer sampling systems. The FS10A is a fast responding, highly repeatable sensor which installs easily into a standard tube tee fitting or new SP76 (NeSSI) modular manifold.

The FS10A utilizes proven thermal-dispersion flow measurement technology with FCI proprietary equal mass sensing to achieve outstanding sensitivity and repeatability. The instrument's wetted parts are superior corrosion-resistant 316L stainless steel with Hastelloy-C sensor tips. An optional all Hastelloy-C sensor element is also available. The sensor element has no moving parts to foul, clog or maintain which ensures continuous reliability and no maintenance costs. There are no cavities, orifices or dead-legs to trap or contaminate samples which preserves sample integrity and faster system sampling times.

FS10A electronics are packaged in a rugged, fully-sealed, aluminum housing which provides exceptional protection and long-life under all process conditions.

The electronics can be integral mounted with the sensor element resulting in unibody, self-contained unit (FS10A-1, FS10A-2) or the electronics can be separated from the sensor for remote mounting

### FS10A Features

- For Gases and Liquids
- Use In Tube Tees or SP76 (NeSSI) Systems
  - Requires Only One SP76 Block
- Superior Low Flow Sensing
- Single Configuration Meets All Flow Ranges, 100:1 Turndown
- Simple Push-Button Field Set-Up
- LED Array Shows Flow Rate and Switch Trip
- Choice of Outputs
  - Relay or Open Collector
  - 4-20 mA Analog Output Option
  - Serial RS232C I/O
- No Moving Parts, Non-Clogging
- No Cavities or Dead-Legs
- Simple, Screw-In Installation
- Lowest Cost Solution for End-Users and System Integrators




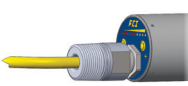
(FS10A-3, FS10A-4). The remote configuration is useful when sensor installation area is subjected to high temperatures, or to mount the front panel and display in a more accessible location.

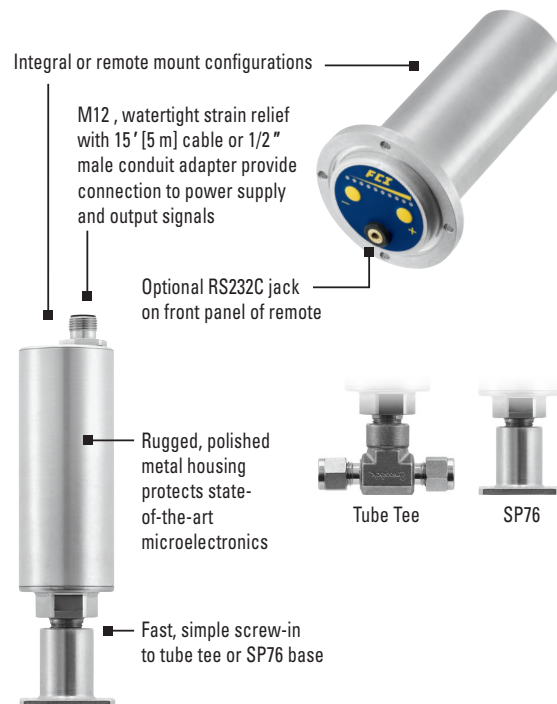
The instrument provides a top-mounted, flow rate monitoring LED array for at-a-glance visual indication of proper flow rate to the analyzer or sampling system, an alarm/trip indication, and as confirmation that the unit is powered and operating. The flow switch's setpoint is conveniently user settable via two push-buttons accessible at the top of the unit, or via its RS232 serial interface.

A choice of electronic outputs is available. The switch output can be either an open collector (n-channel) or a 1A relay settable for NO or NC operation. The switch settings are user programmable for trip control of hysteresis and time delay. Also included standard is a 4-20mA output for flow rate trending or it can be assigned to temperature.



FS10A has a common 1/4 inch NPT (male) connection for threading into standard tube tee fittings or FCI's SP76 base. Electrical and electronic connections at the FS10A are via a standard M12 connector or a fixed cable gland with tinned and marked wire leads for user's connections.

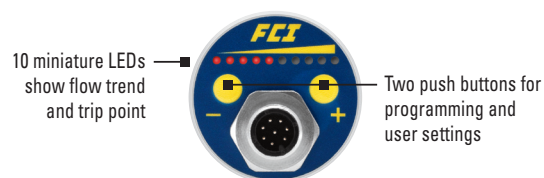
## Integral Configuration

Front Panel/Top	Selections	Block 5 Order Code (FS10A OIS)
	With watertight cable gland to cable pigtail; 15' [5 m]	Block 5, Code 1
	With M12 (male) connector For user supplied M12 cable	Block 5, Code 2
	M12, supplied with mating cable M12 to cable pigtail	■ 6' [2 m]: (Block 5, Code 3) ■ 15' [5 m]: (Block 5, Code 4) ■ 30' [10 m]: (Block 5, Code 5)
	1/2" NPT (male) conduit adapter with watertight cable gland to cable pigtail; 15' [5 m]	Block 5, Code 6



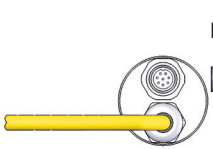
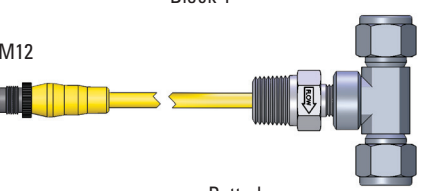
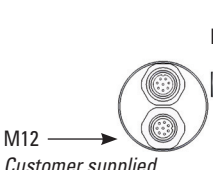
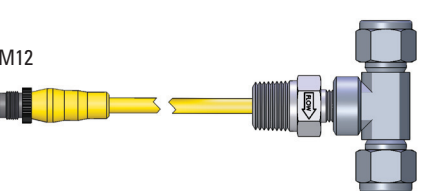
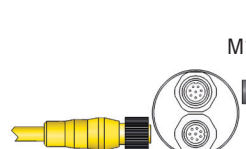
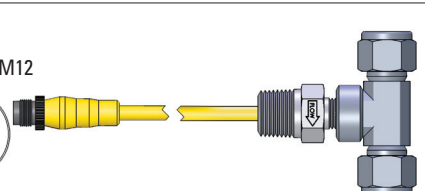
## Remote Configuration

Front Panel/Top	Selections	Block 1 Order Code (FS10A OIS)
	Standard	Block 1, Code 3
	With RS232C connector jack on front panel; sealed with threaded cap and "O" ring when not in use	Block 1, Code 4



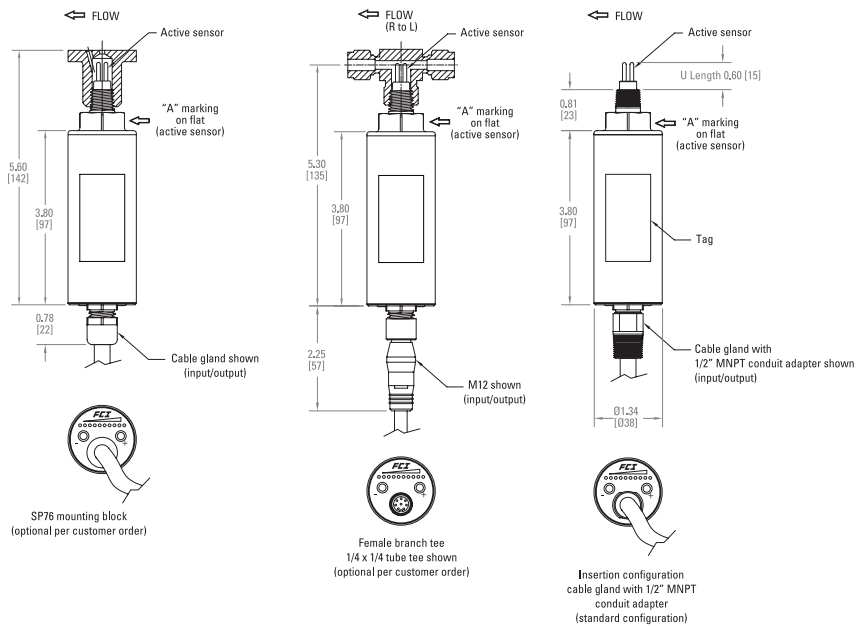
### Block 5 Order Code (FS10A OIS)

### Block 4 Order Code (FS10A OIS)

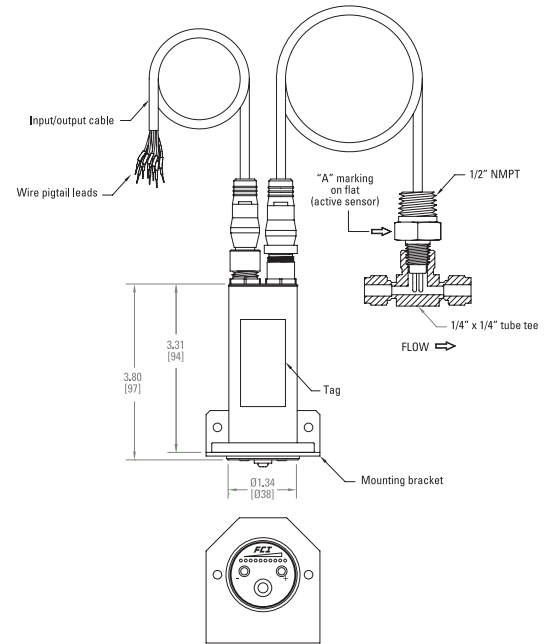
	Power Input/Outputs Block 5	From Flow Element to Electronics Block 4	
<b>Code 1</b> 15' [5 m]			
<b>Code 2</b>			
<b>Code 3</b> 6' [2 m] <b>Code 4</b> 15' [5 m] <b>Code 5</b> 30' [10 m]			<b>B</b> 6' [2 m]; polyurethane jacketed <b>C</b> 15' [5 m]; polyurethane jacketed <b>D</b> 30' [10 m]; polyurethane jacketed <b>E</b> 6' [2 m]; PTFE <b>F</b> 15' [5 m]; PTFE <b>G</b> 30' [10 m]; PTFE

## Dimensional Drawings

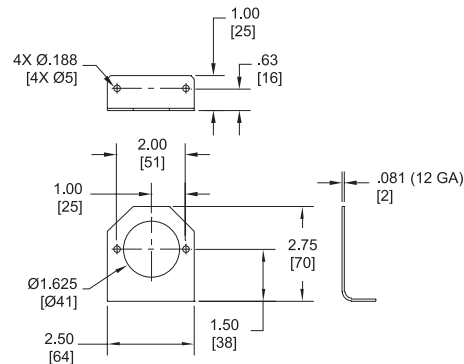
### Integral Mount



### Remote Mount

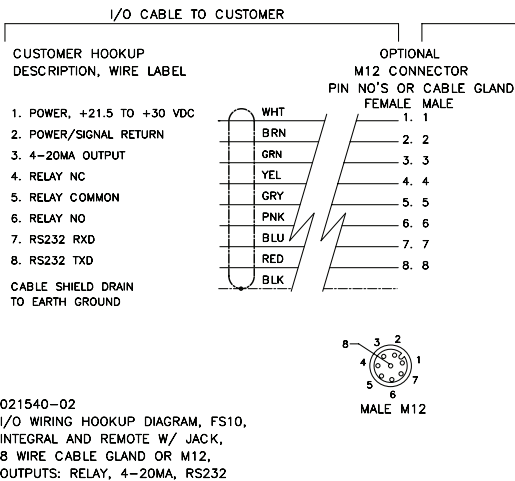


### Mounting Bracket Included with remote configuration



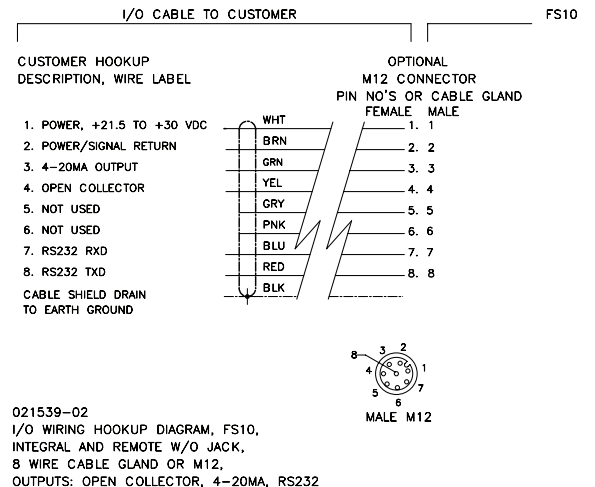
## Input/Output Wiring Diagrams

FS10A OIS:  
Block 6, Code E



FS10

FS10A OIS:  
Block 6, Code D



## FS10A Specifications

### Instrument

**Media Compatibility:** All gases and liquids compatible with 316L stainless steel and Hastelloy C22

**Process Connection:** 1/4" NPT; compatible with 1/4", 3/8" and 1/2" tube tee, 1/4" tube tee with 1/8" injection tube adapters and SP76 adapter (FCI part number 019897-01)

#### Flow Sensitivity/Range

	Air / Gas		Liquids	
	CC/Min Min	SCFH Max	CC/Min Min	GPH Max
1/8" tube adapter with 0.0625" ID injection tube	10	2,000	0.02	5
1/8" tube adapter with 0.0940" ID injection tube	25	5,000	0.05	10
1/4" tube tee	50	20,000	0.10	40
SP76 adapter	50	20,000	0.10	40
3/8" tube tee	180	50,000	0.40	100
1/2" tube tee	375	100,000	0.80	200

**Repeatability:**  $\pm 0.5\%$  of reading

**Temperature Coefficient** For temperatures  $> \pm 30^\circ\text{F}$  [ $\pm 16^\circ\text{C}$ ]

Gas: Maximum  $\pm 0.025\%$  of reading/ $^\circ\text{F}$  up to  $500^\circ\text{F}$  [ $\pm 0.05\%$  of reading/ $^\circ\text{C}$  up to  $260^\circ\text{C}$ ]

Liquid: Maximum  $\pm 0.2\%$  of reading/ $^\circ\text{F}$  up to  $250^\circ\text{F}$  [ $\pm 0.367\%$  of reading/ $^\circ\text{C}$  up to  $121^\circ\text{C}$ ]

**Turndown Ratio:** 5:1 to 100:1

### Agency Approvals

FM, FMC: Nonincendive, Class I Division 2 Groups A, B, C, D; Class II, Division 2 Groups E, F, G; Class III, T4@Ta=71°C Type 4X

ATEX: II 3 G Ex nA IIC T4 Gc  
II 3 D Ex tc IIIC T81 °C Dc  
IP64

IECEX: Ex nA and Ex t  
Ex nA IIC T4 Gc  
II 3 D Ex tc IIIC T81 °C Dc

CE Mark

### Flow Element

**Materials of Construction:** (Wetted parts) 316L stainless steel with Hastelloy C-22 thermowells; optional, all Hastelloy-C22 probe assembly

#### Operating Temperature

Standard:  $-40^\circ\text{F}$  to  $250^\circ\text{F}$  [ $-40^\circ\text{C}$  to  $121^\circ\text{C}$ ]

Optional:  $-40^\circ\text{F}$  to  $500^\circ\text{F}$  [ $-40^\circ\text{C}$  to  $260^\circ\text{C}$ ]; remote configuration only

#### Operating Pressure

Tube tee fitting: 500 psig [34 bar (g)]

SP76 adapter: Per SP76 manifold specifications up to 500 psig [34 bar (g)] maximum

### Transmitter/Electronics

**Enclosure:** NEMA 4X [IP64], anodized aluminum

**Operating Temperature:**  $-40^\circ\text{F}$  to  $160^\circ\text{F}$  [ $-40^\circ\text{C}$  to  $71^\circ\text{C}$ ]

#### Output Signals

	Block 6, Order Code D	Block 6, Order Code E
Open Collector N-Channel (100 mA)	■	
Relay, SPDT; 1A @ 24 Vdc; 120 Vac (ATEX: DC only)		■
4-20 mA Trending Output *	■	■
RS232C Serial I/O	■	■

\* 500 max. load; user scalable, general purpose, uncalibrated output proportional to flow rate for trend monitoring or assignable to temperature; fault indication per NAMUR NE43 guidelines, user-selectable for high ( $> 21.0\text{ mA}$ ) or low ( $< 3.6\text{ mA}$ ) default

For linearized and calibrated analog outputs, see FCI's line of thermal mass flow meter products

**Display:** 10 LED array, red; sequential lighting proportional to flow trend and flashes at setpoint

**User Interface:** Two top-mounted push buttons to program switch/trip point, zero and span setting, relay hysteresis and time delay; button operation may be user disabled to prevent unwanted changes; all set-up functions also programmable via RS232C port

**Input Power:** 24 Vdc (21.5 Vdc to 30 Vdc); maximum 2.5 watts

**Remote Configuration:** Transmitter/electronics are separated from the flow element and interconnected with a cable; flow element has potted cable terminating in an M12 for direct plug-in connection with the electronics; cable lengths available in 6', 15' and 30' [2 m, 5 m or 10 m] lengths; optional extended temperature service to  $500^\circ\text{F}$  [ $260^\circ\text{C}$ ] requires selection of the interconnecting cable with PTFE jacketing

**FCI FLUID COMPONENTS INTERNATIONAL LLC**

Locally Represented By:

Visit FCI online at [www.FluidComponents.com](http://www.FluidComponents.com) | FCI is ISO 9001:2000 and AS9100 Certified

#### FCI World Headquarters

1755 La Costa Meadows Drive | San Marcos, California 92078 USA | Phone: 760-744-6950 Toll Free (US): 800-854-1993 Fax: 760-736-6250

#### FCI Europe

Persephonestraat 3-01 | 5047 TT Tilburg, The Netherlands | Phone: 31-13-5159989 Fax: 31-13-5799036

#### FCI Measurement and Control Technology (Beijing) Co., LTD | [www.fluidcomponents.cn](http://www.fluidcomponents.cn)

Room 107, Xianfeng Building II, No.7 Kaituo Road, Shangdi IT Industry Base, Haidian District | Beijing 100085, P. R. China  
Phone: 86-10-82782381 Fax: 86-10-58851152