

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




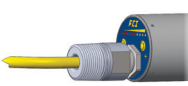
(FS10A-3, FS10A-4). The remote configuration is useful when sensor installation area is subjected to high temperatures, or to mount the front panel and display in a more accessible location.

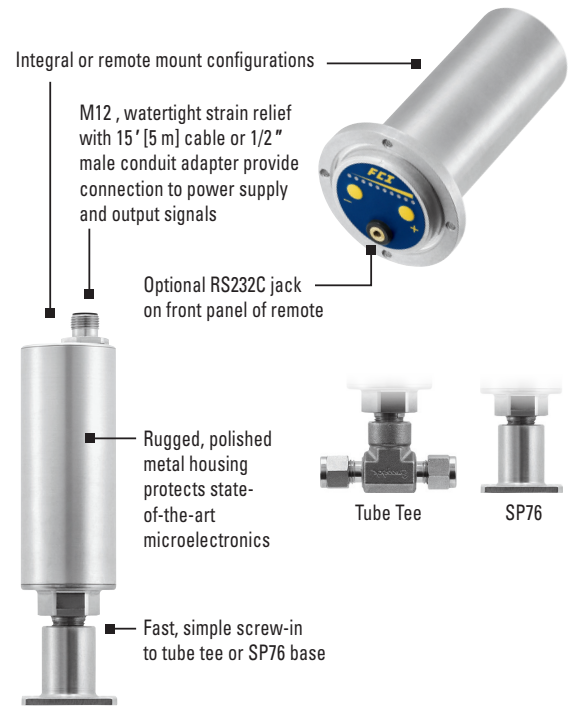
The instrument provides a top-mounted, flow rate monitoring LED array for at-a-glance visual indication of proper flow rate to the analyzer or sampling system, an alarm/trip indication, and as confirmation that the unit is powered and operating. The flow switch's setpoint is conveniently user settable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

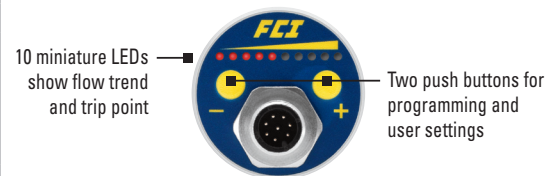
Integral Configuration

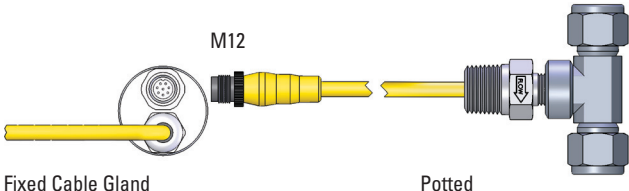
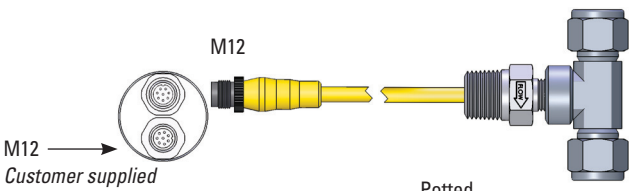
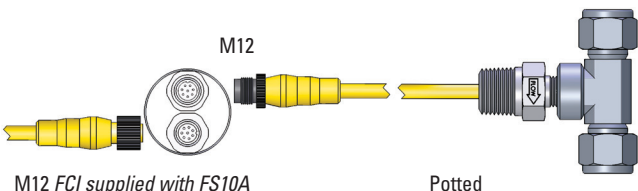
| Front Panel/Top | Selections | Block 5 Order Code (FS10A OIS) |
|---|---|--|
|  | With watertight cable gland to cable pigtail; 15' [5 m] | Block 5, Code 1 |
|  | With M12 (male) connector For user supplied M12 cable | Block 5, Code 2 |
|  | M12, supplied with mating cable M12 to cable pigtail | <ul style="list-style-type: none"> 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

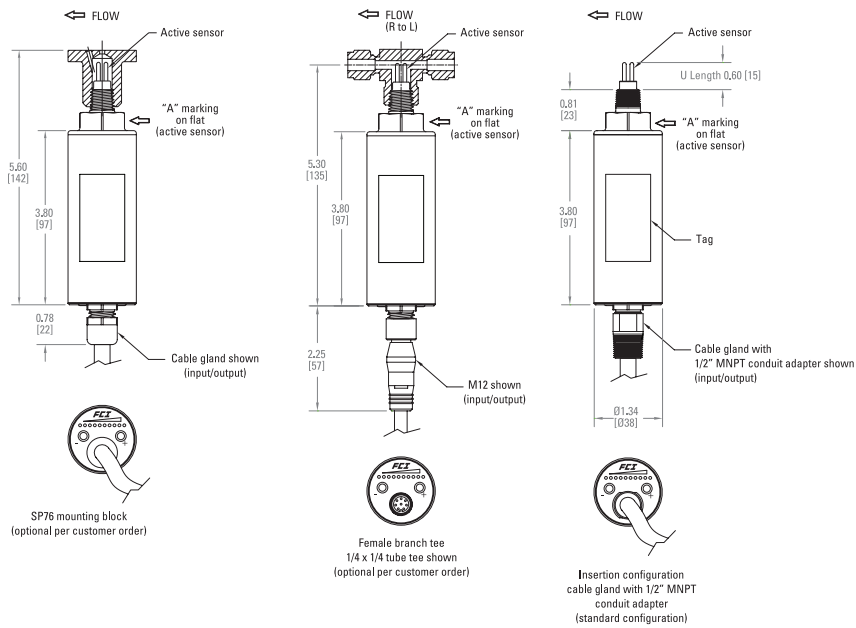
| Front Panel/Top | Selections | Block 1 Order Code (FS10A OIS) |
|---|--|--------------------------------|
|  | Standard | Block 1, Code 3 |
|  | With RS232C connector jack on front panel; sealed with threaded cap and "O" ring when not in use | Block 1, Code 4 |



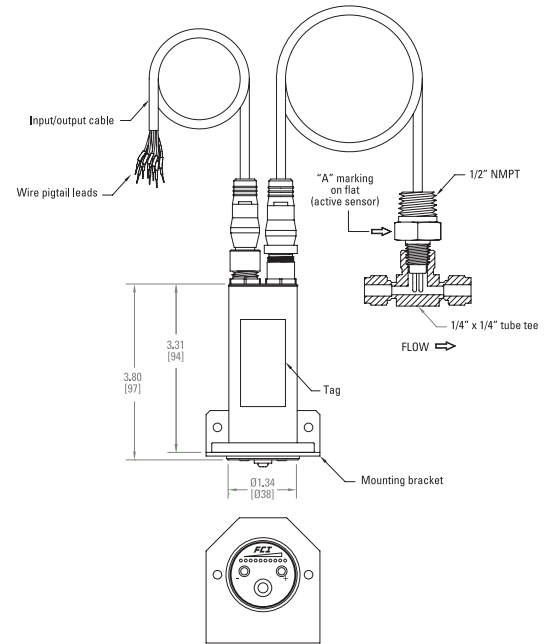
| Block 5 Order Code (FS10A OIS) | | Block 4 Order Code (FS10A OIS) |
|---|--|--|
| | <p><u>Power Input/Outputs</u> Block 5</p> <p><u>From Flow Element to Electronics</u> Block 4</p> | |
| Code 1 15' [5 m] |  <p>Fixed Cable Gland</p> <p>Potted</p> | |
| Code 2 |  <p>M12 Customer supplied</p> <p>Potted</p> | |
| Code 3 6' [2 m] Code 4 15' [5 m] Code 5 30' [10 m] |  <p>M12 FCI supplied with FS10A</p> <p>Potted</p> | <p>B 6' [2 m]; polyurethane jacketed</p> <p>C 15' [5 m]; polyurethane jacketed</p> <p>D 30' [10 m]; polyurethane jacketed</p> <p>E 6' [2 m]; PTFE</p> <p>F 15' [5 m]; PTFE</p> <p>G 30' [10 m]; PTFE</p> |

Dimensional Drawings

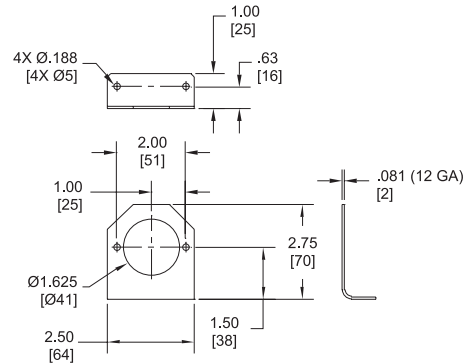
Integral Mount



Remote Mount

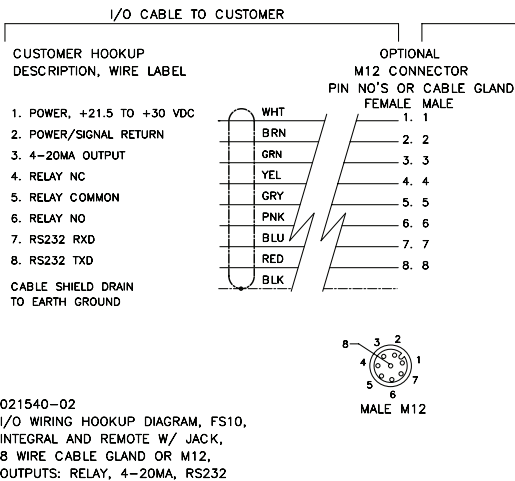


Mounting Bracket *Included with remote configuration*



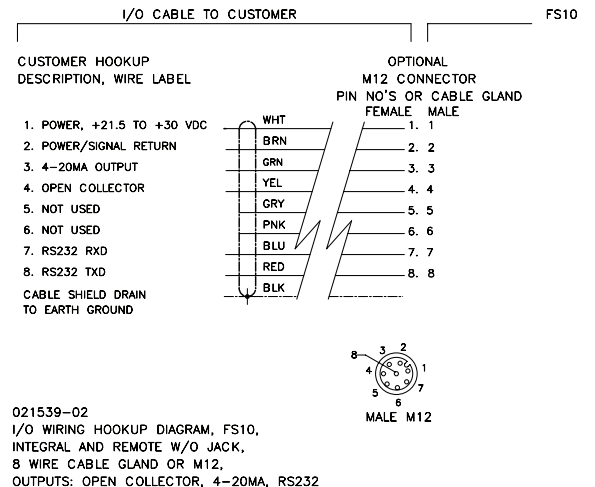
Input/Output Wiring Diagrams

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 | | SCFH | | CC/Min | | GPH | |
| | Min | Max | Min | Max | Min | Max | Min | Max |
| 1/8" tube adapter with 0.0625" ID injection tube | 10 | 2,000 | 0.02 | 5 | 0.70 | 18.00 | 0.01 | 0.30 |
| 1/8" tube adapter with 0.0940" ID injection tube | 25 | 5,000 | 0.05 | 10 | 1.50 | 40.00 | 0.03 | 0.60 |
| 1/4" tube tee | 50 | 20,000 | 0.10 | 40 | 4.00 | 100.00 | 0.07 | 1.70 |
| SP76 adapter | 50 | 20,000 | 0.10 | 40 | 4.00 | 100.00 | 0.07 | 1.70 |
| 3/8" tube tee | 180 | 50,000 | 0.40 | 100 | 14.00 | 350.00 | 0.20 | 5.50 |
| 1/2" tube tee | 375 | 100,000 | 0.80 | 200 | 30.00 | 750.00 | 0.50 | 12.00 |

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°F [$\pm 0.05\%$ of reading/ $^\circ\text{C}$ up to 260°C]

Liquid: Maximum $\pm 0.2\%$ of reading/ $^\circ\text{F}$ up to 250°F [$\pm 0.367\%$ of reading/ $^\circ\text{C}$ up to 121°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°F to 250°F [-40°C to 121°C]

Optional: -40°F to 500°F [-40°C to 260°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°F to 160°F [-40°C to 71°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°F [260°C] requires selection of the interconnecting cable with PTFE jacketing

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