

For Process Analyzers and Sample Handling Systems

SIL2
Compliance Rating

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



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-22 sensor tips. An optional all Hastelloy C-22 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-A, FS10A-B). 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.

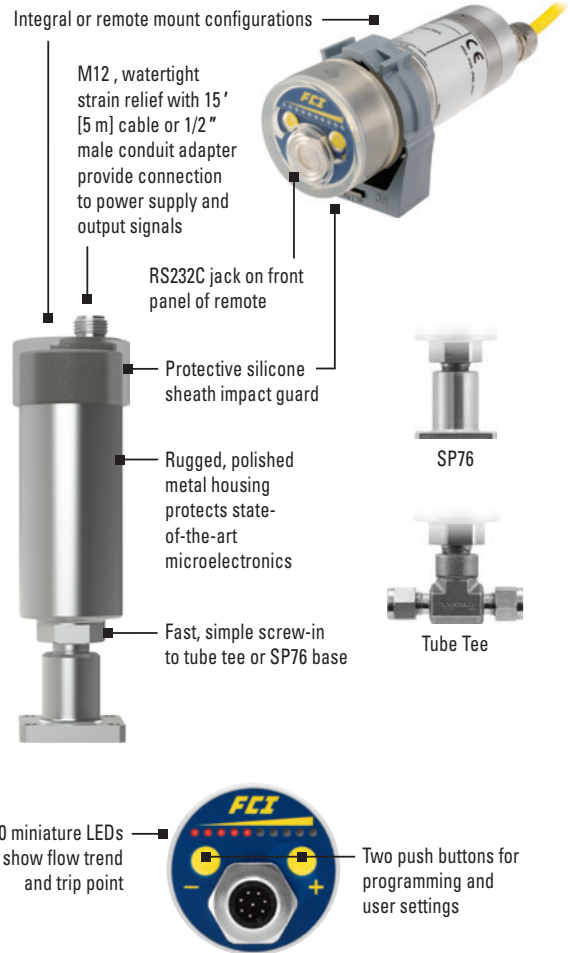
FS10A has a common 1/4 inch NPT (male) connection for threading into standard tube tee fittings or FCI's SP76 base. Electrical and electronic connections at the FS10A are via a standard M12 connector or a fixed cable gland with tinned and marked wire leads for user's connections.

Integral Configuration

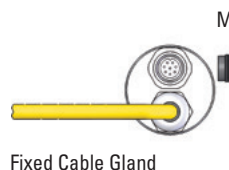
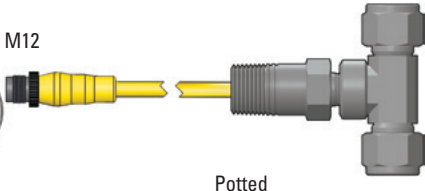
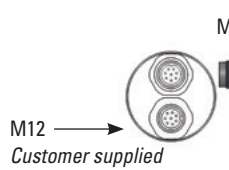
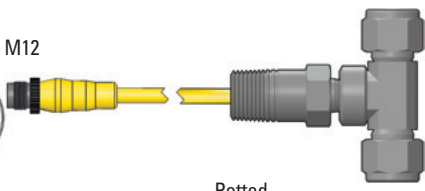

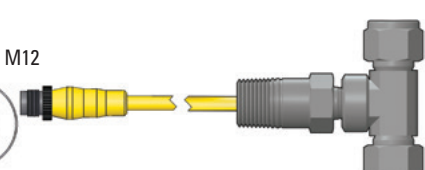
Front Panel / Top	Selections	Block 5 Order Code (FS10A OIS)
	With watertight cable gland to cable pigtail; 15' [5 m] <i>Not available with ATEX approval</i>	Block 5, Code 1
	With M12 (male) connector <i>For user supplied M12 cable</i>	Block 5, Code 2
	M12, supplied with mating cable M12 to cable pigtail	<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)
 <i>Shown with sealed plug</i>	Panel mount version: supplied with panel mounting collar with O-ring seals for both panel and instrument sides	Block 1, Code A
 <i>Shown with RS232C jack exposed</i>	Surface/wall mount version: supplied with mounting bracket for securing instrument body to a surface	Block 1, Code B



Block 5 Order Code (FS10A OIS)

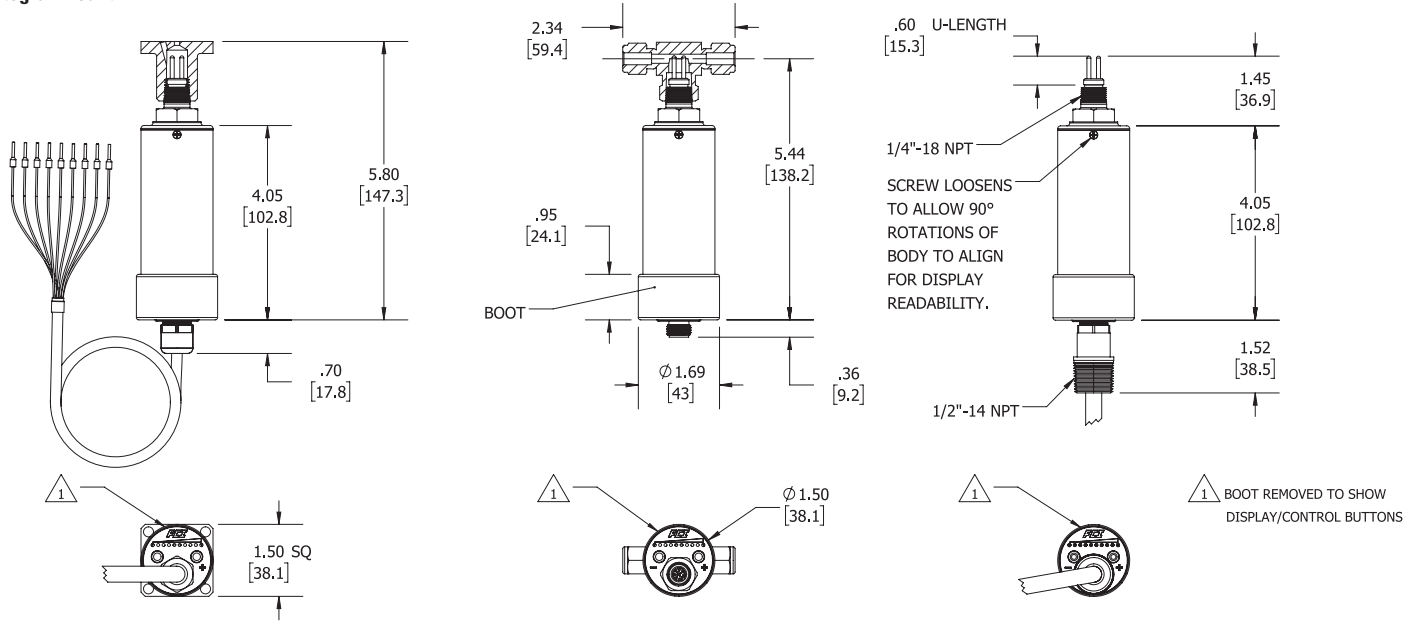
	Power Input/Outputs Block 5	From Flow Element to Electronics Block 4
Code 1 15' [5 m]	 Fixed Cable Gland	 Potted
Code 2	 M12 → Customer supplied	 Potted
Code 3 6' [2 m] Code 4 15' [5 m] Code 5 30' [10 m]	 M12 FCI supplied with FS10A	 Potted

Block 4 Order Code (FS10A OIS)

Code	Length	Connection at Flow Element	Connection at Electronics	Temp Service	Jacket Type
B	6' [2 m]	Potted	Molded M12	176 °F [80 °C]	Polyurethane
C	15' [5 m]	Potted	Molded M12	176 °F [80 °C]	Polyurethane
D	30' [10 m]	Potted	Molded M12	176 °F [80 °C]	Polyurethane
H	6' [2 m]	Potted	Removable M12	176 °F [80 °C]	Polyurethane
J	15' [5 m]	Potted	Removable M12	176 °F [80 °C]	Polyurethane
K	30' [10 m]	Potted	Removable M12	176 °F [80 °C]	Polyurethane
E	6' [2 m]	Potted	Removable M12	500 °F [260 °C]	PTFE
F	15' [5 m]	Potted	Removable M12	500 °F [260 °C]	PTFE
G	30' [10 m]	Potted	Removable M12	500 °F [260 °C]	PTFE

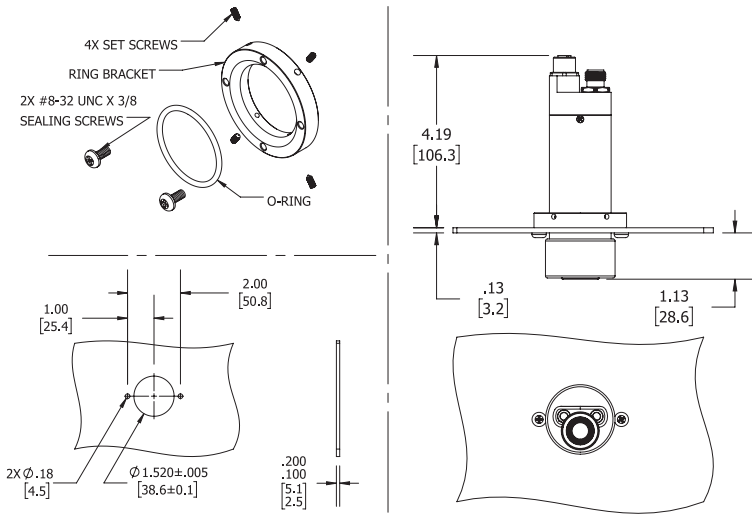
Dimensional Drawings

Integral Mount

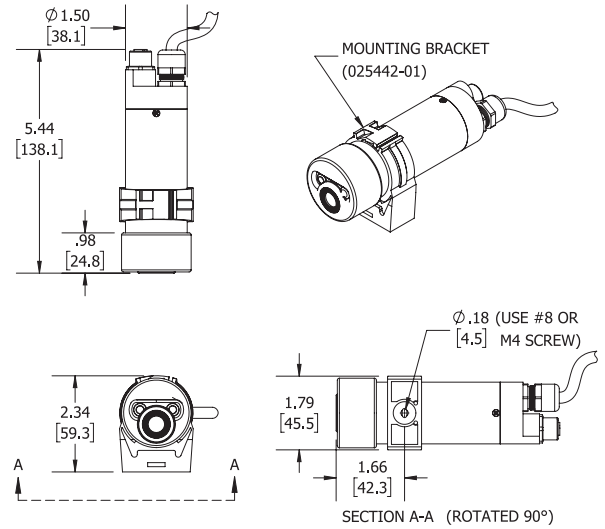


Remote Mount

Panel Mount Adapter *Selectable for remote configuration*

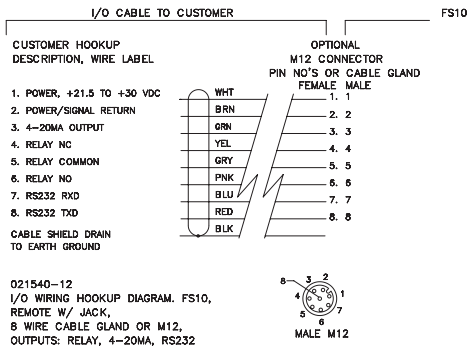


Surface/Wall Mounting Bracket *Selectable for remote configuration*

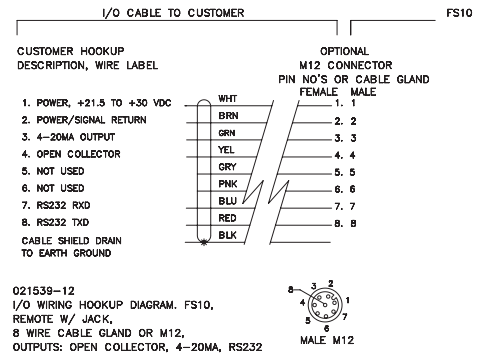


Input/Output Wiring Diagrams

FS10A OIS: Block 6, Code E



FS10A OIS: Block 6, Code D



FS10A Specifications

Instrument

Media Compatibility: All gases and liquids compatible with 316L stainless steel and Hastelloy C-22

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: ±0.5% of reading

Temperature Coefficient For temperatures > ±30 °F [±16 °C]

Gas: Maximum ±0.025% of reading/°F up to 500 °F [±0.05% of reading/°C up to 260 °C]

Liquid: Maximum ±0.2% of reading/°F up to 250 °F [±0.367% of reading/°C up to 121 °C]

Turndown Ratio: 5:1 to 100:1

Agency Approvals

SIL: SIL 2 Compliant; Safe Failure Fraction (SFF) 90%

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, IEC: Nonincendive for gas and dust, Zone 2
II 3 G Ex nA IIC T4 Gc
II 3 D Ex tc IIIC T81 °C Dc
IP64 (IP65, IP66, IP67 in non-Ex installations)

Remote Flow Element

FM, FMc: Class I, Division 1, Groups A, B, C, D; T2...T6
Ta = -40°C TO +65°C (electronics)
Class II/III, Division 1 Groups E, F, G; T2...T6
Ta = -40°C to +65°C (electronics); Type 4X, IP67
Tp = -40°C to +260°C (T1...T6); includes Zone 1/Division 1 ambient temperature zone for a remote mounted flow element

ATEX: II 2 G Ex d IIC Gb T2...T6; Ta = 40°C TO +65°C
II 2 D Ex tb IIIC Db T300°C...T85°C; IP67

IEC: Ex d IIC Gb T2...T6; Ta = 40°C TO +65°C
Ex tb IIIC Db T300°C...T85°C; IP67

Refer to *Probe Installation Operation Manual* (06EN003428) for Zone 1/Division 1 installation

CE Marking, CRN, complies with Canadian Electrical code requirements of ANSI/ISA 12.27.01-2011 as a single seal device

Flow Element

Materials of Construction: (Wetted parts) 316L stainless steel with Hastelloy C-22 thermowells; optional, all Hastelloy C-22 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: Tube tee and insertion – 2000 psig [137 bar (g)]

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

Enclosure / Housing

Material: Stainless steel body; aluminum end-cap/top with polyester overlay and clear, silicone sheath impact guard

Protection Ratings

Non-Ex installations: IP65, IP66, IP67

FM, FMc approved: NEMA 4X

ATEX, IECEx approved: IP64

Transmitter / Electronics

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 (100mA)	■	
Relay, SPDT; 1A @ 24 Vdc; 120 Vac (ATEX: DC only)		■
4-20mA 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 (>21.0mA) or low (<3.6mA) 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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