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UNIVERSAL® Flow Monitors

FlowStream® Mass Flowmeters for Gases

FlowStream®



TYPICAL APPLICATIONS
- Blanketing
- Sparging/Purging Gases
- Burner Management
- Assist Gases
- Leak Tests
- Injectable Gases
- Shielding Gas
- Gas Consumption
- Gas Blending
- Gas Chromatography

Features

Meter types
- Output options: current, voltage, frequency, and scaled pulse
- Programmable set points
- Open collector outputs
- Intrinsically safe for hazardous location use - CSA and CE

Selectable options for installed units
- Response time (5 or 50 ms)
- Open collector set point flow rates
- Range of electrical output
- Visual readout of flow rate or total, pressure and temperature

General Description

Laminar Flow Element differential pressure flowmeters are good for clean, dry, non-corrosive, non-condensing gasses. Corrected for temperature and pressure, it has a mass flow output. The EMI immunity and fast response (5 ms available) make the meters suitable for robotics' applications (painting or welding). A variety of outputs are available (4-20 mA, 0-5 V, and pulse). NIST traceable and CSA units are Type 4 weatherproof. The accuracy is a uniform 1% of full scale subject to limitations described in the Specifications section.

Units with a display can indicate flow rate or total as well as gas temperature and pressure.

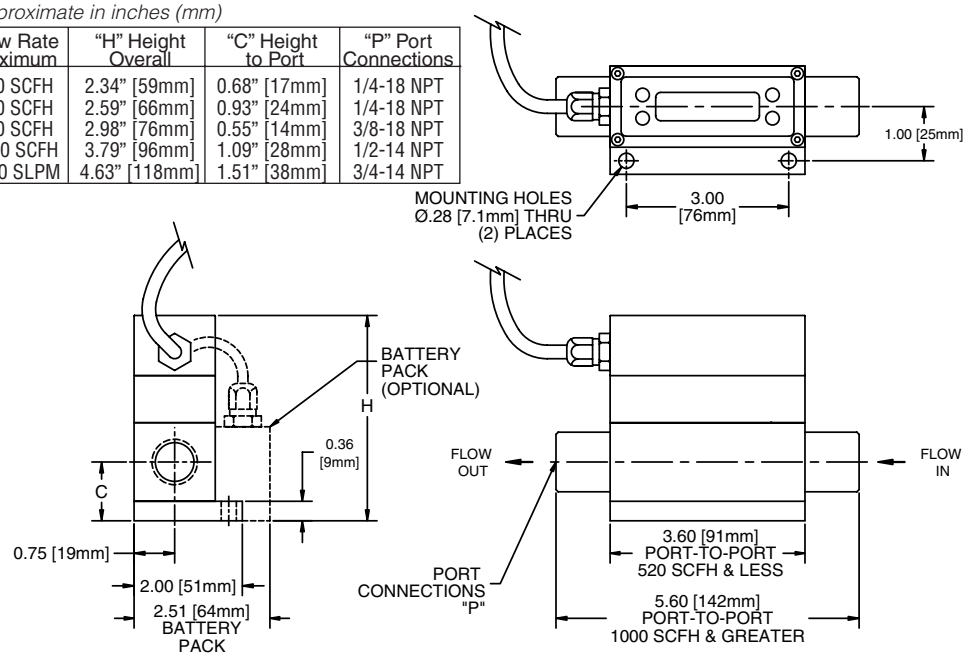
Calibration is done on air with empirically derived conversion factors. Oxygen cleaning optional.

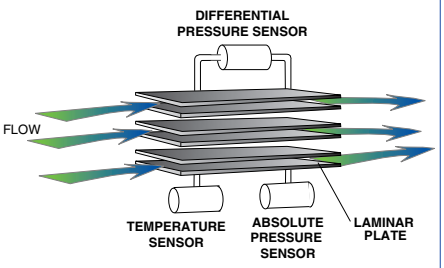
Sizes range from 1/4 to 3/4 inch NPT. Anodized aluminum is the standard material for the meter body and 316 Stainless Steel is available for use where external corrosion is a factor.

Dimensions of OFS/OFM Series

Approximate in inches (mm)

Flow Rate Maximum	"H" Height Overall	"C" Height to Port	"P" Port Connections
120 SCFH	2.34" [59mm]	0.68" [17mm]	1/4-18 NPT
280 SCFH	2.59" [66mm]	0.93" [24mm]	1/4-18 NPT
520 SCFH	2.98" [76mm]	0.55" [14mm]	3/8-18 NPT
1000 SCFH	3.79" [96mm]	1.09" [28mm]	1/2-14 NPT
1000 SLPM	4.63" [118mm]	1.51" [38mm]	3/4-14 NPT





HOW IT WORKS:
Gas flow passes through the laminar flow element, the pressure drop and output measured is linearly proportional to the flow rate.

General Instrument Specifications

Flow Ranges: 500 SCCM full scale to 1,000 SLPM full scale, 1 SCFH full scale to 2,100 SCFH full scale

Turndown Ratio: 100:1

Maximum Operating Pressure: 100 PSIG

Burst Pressure: 200 PSIG

Pressure Effect on Accuracy: Less than 0.03% full scale / PSI (See ***Note 1***)

Maximum Operating Temperature: 176 °F (80 ºC)

Minimum Operating Temperature: -13 °F (-25 ºC)

Temperature Effect on Accuracy: Less than 0.03% full scale / °F

Maximum Pressure Drop: **Normal** 2 PSI, Max 3.5 PSI
(Individually listed under Multigas Flow Selection chart by port size and flow rate)

Process Connections: 1/4"-3/8"-1/2"-3/4"
Available in NPT, BSPT, BSPP and SAE

Wetted Parts

- **Sensors:** Glass-filled nylon, alumina-based ceramic, silicon, gold, epoxy
- **Flow Body Internals:** Anodized aluminum or 300 series stainless steel, Viton® or buna n seals

Enclosure Rating: Type 4

Display: 4-digit LCD digital display, 0.35" high

Approvals: CE, CSA, Intrinsic Safety (all classes and divisions) with proper zener barrier.

Note 1*: Most of the error at high pressures is due to sensor offset shifts. Accuracy can be improved by re-zeroing the meter at operating pressure or calibrating at the specific pressure.*

Electrical Specifications

Accuracy (Including Linearity and Repeatability)

- **Flow:** ± 1% of full-scale for flowmeters sized from 15-566 SLPM (31-1200 SCFH) of Air
  ± 2% of full-scale for flowmeters sized for lower than 15 SLPM (30 SCFH) of Air
  ± 2% of full-scale for flowmeters sized for higher than 566 SLPM (1201 SCFH) of Air
- **Pressure:** ± 1 PSI (See ***Note 2***)
- **Temperature:** ± 3 °F
- **Totalizer:** ± 0.25% of full-scale (in addition to flow accuracy)

Output Signal

- **Analog:** 4-20 mA (2-wire loop powered)
  0-5 V, 0-10 V, 1-5 V, 2-10 V
- **Frequency:** 0-1000 Hz, 200-1200 Hz
  0-3V signal amplitude
- **Pulse:** 1,250-5,000 pulses/minute, user selectable
  0-3V pulse amplitude
  2 msec pulse width

Response Time: user selectable 5 msec or 50 msec (to 63% of step change) for analog outputs, 50 msec (to 63% of step change) for frequency and pulse outputs

Alarms: 2 independent open-collector outputs (high/low flow rate) with corresponding LEDs
Open-Collector Rating 30VDC at 50 mA

Electrical Connection: 4- or 7-conductor shielded cable with pigtail

Supply Voltage: 10-30 VDC is standard
12-24 VDC for Intrinsically Safe
7.2-9 VDC for battery-operated units (See ***Note 3***)

Supply Current: 22 mA @ F.S. flow (includes over-range) for 4-20 mA loop-powered transmitters
5 mA for voltage, frequency, and pulse outputs
3.5 mA for battery-operated units (See ***Note 3***)

Note 2: *Pressure, temperature, and totalizer are only displayed on the LCD. No output signal is available for these parameters.*

Viton® is a registered trademark for DuPont Performance Elastomers.

How To Order Flowstream for a Single Gas

Select the appropriate symbols to build a model code:

Example: OFS - E F - 3 A - 200 SLPM - T - X 1B - D10

SERIES = OFS

MATERIAL FOR METER BODY

Anodized Aluminum	= E
316 Stainless Steel	= I

SEALS

Viton®	= F
Buna N	= B

THREAD TYPE FOR THREADED PORT

N	= NPT
T	= SAE
B	= BSPT
P	= BSPP

GAS

Air	Argon	CO2	Helium	Hydrogen	Methane	Oxygen	Nitrogen
= A	= R	= CO2	= HE	= H	= M	= O2	= N

PIPE SIZE in Inches		MAXIMUM FLOW IN SLPM							
1/4	= 2	128	107	64	116	256	107	116	128
3/8	= 3	* 228	190	114	208	457	190	208	228
1/2	= 4	548	457	274	498	1096	457	498	548
3/4	= 6	1000	833	500	909	1999	833	909	1000
		MAXIMUM FLOW IN SCFH							
1/4	= 2	280	233	140	255	560	233	255	280
3/8	= 3	500	417	250	455	1000	417	455	500
1/2	= 4	1200	1000	600	1091	2400	1000	1091	1200
3/4	= 6	2188	1824	1094	1989	4377	1824	1989	2188

NOTE: Lowest maximum flow rates are 50 SCCM and 1 SCFH respectively.

** NOTE: The flows selected in each size must be less than or equal to the maximum.*

OUTPUT

Digital Visual Display with Output

X 1A	= 4-20mA
X 1B	= 4-20mA with 2 alarms
X 2A	= 4-20mA Intrinsically Safe
X 4A	= 0-5 VDC
X 4B	= 0-5 VDC with 2 alarms
X 5A	= 0-10 VDC
X 5B	= 0-10 VDC with 2 alarms
X 12A	= 1-5 VDC
X 12B	= 1-5 VDC with 2 alarms
X 14A	= 2-10 VDC
X 14B	= 2-10 VDC with 2 alarms
X 19A	= 0-1000 HZ
X 20A	= 200-1200 HZ
X 22A	= pulse out (rate varies with size)
X 30A	= 0-5 VDC (bi-directional flow)
X 40A	= visual readout only (battery powered)

No Visual Display with Output

Z 1A	= 4-20mA
Z 2A	= 4-20mA Intrinsically Safe
Z 4A	= 0-5 VDC
Z 5A	= 0-10 VDC
Z 12A	= 1-5 VDC
Z 14A	= 2-10 VDC
Z 19A	= 0-1000 HZ
Z 20A	= 200-1200 HZ
Z 22A	= pulse out (rate varies with size)
Z 30A	= 0-5 VDC (bi-directional flow)

SPECIAL OPTIONS

CLEAN FOR OXYGEN SERVICE	=	C1
10 FOOT CABLE	=	D10
VACUUM USE (7.35 to 14.7PSIA)	=	ZVAC

NOTE: Also good for use at normal pressures

UNIVERSAL UFM FLOW MONITORS

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