

1-2100 SCFH (.5-1000 SLPM) 125 PSIA (8.67 Bar) OFS (Single Gas) Series OFM (Multigas) Series

UNIVERSAL® Flow Monitors

FlowStream[®] Mass Flow Meters for Gases

FlowStream®



TYPICAL APPLICATIONS

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

Features

Meter types

- Output options: current, voltage, frequency, scaled pulse
- · Battery operated
- Bi-directional
- Programmable Set Points
- · Open Collector Outputs
- Intrinsically Safe for Hazardous Location Use CSA

Selectable options for installed units

- Gas measured (for Multigas 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, pulse and others). CE rated. NIST traceable, CSA and CENELEC 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.

Multi-gas calibration is an option wherein the commonly used gasses like Air, Argon, Helium, Methane (natural gas), Carbon Dioxide, Nitrogen, Oxygen and Hydrogen are all selectable from a menu on the flowmeter. Battery operated units are offered. Calibration for specific pressures to maximize accuracy is available up to 100 PSIA. Calibration is done on air with empirically derived conversion factors although calibration on actual gasses is available for certification requiring it. 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) C" Height to Port Flow Rate "H" Height "P" Port С Overall Connections Maximum 120 SCFH 2.34" [59mm] 1/4-18 NPT 0.68" [17mm] 280 SCFH 0 0 2.59" 0.93" 1/4-18 NPT Ì66mm ľ24mm $\overline{\mathbf{O}}$ 520 SCFH 3/8-18 NPT \cap 2.98" [76mm 0.55" [14mm 1.00 [25mm] 1000 SCFH 3.79" [96mm] 1.09" [28mm] 1/2-14 NPT Ф -Æ 1000 SLPM 4.63" [118mm] 1.51" [38mm] 3/4-14 NPT MOUNTING HOLES Ø.28 [7.1mm] THRU (2) PLACES 3.00 [76mm] BATTERY PACK (OPTIONAL) 0.36 FLOW FLOW [9mm] OUT IN С 3.60 [91mm] PORT-TO-PORT 0.75 [19mm] PORT 520 SCFH & LESS 2.00 [51mm] CONNECTIONS 5.60 [142mm] PORT-TO-PORT 1000 SCFH & GREATER 2.51 [64mm] "P BA PACK



HOW IT WORKS:

Electrical Specifications

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,	Accuracy (Including Linearity and Repeatability)		
Turndown Ratio:	1 SCFH full scale to 2,100 SCFH full scale 100:1	Flow:	\pm 1% of full-scale for flowmeters sized from 15-566 SLPM (31-1200 SCFH) of Air	
Maximum Operating Pressure:	125 PSIG		\pm 2% of full-scale for flowmeters sized for lower than 15 SLPM (30 SCFH) of Air	
Burst Pressure: Pressure Effect	200 PSIG		\pm 2% of full-scale for flowmeters sized for higher than 566 SLPM (1201 SCFH) of Air	
on Accuracy:	Less than 0.03% full scale / PSI (See Note 1)	Pressure:	± 1 PSI (See <i>Note 2</i>)	
Maximum Operating	17C °F (90 °C)	Temperature:	± 3 °F	
Temperature:	176 °F (80 ºC)	Totalizer:	\pm 0.25% of full-scale (in addition to flow accuracy)	
Temperature:	-13 °F (-25 °C)	Output Signal		
Temperature Effect on Accuracy:	Less than 0.03% full scale / °F	Analog:	4-20 mA (2-wire loop powered) 0-5 V, 0-10 V, 1-5 V, 2-10 V 0-5 V Bi-directional (2 5 V = 0 flow)	
Maximum Pressure Drop:	2 PSI at full scale flow (lower for smaller sizes)	Frequency:	0-1000 Hz, 200-1200 Hz 0-3V signal amplitude	
Process Connections:	1/4"-3/8"-1/2"-3/4" NPT female. BSPT, BSPP and SAE available	Pulse:	1,250-5,000 pulses/minute, user selectable 0-3V pulse amplitude 2 msco pulso width	
Wetted Parts		Deenenee Timer	2 msec pulse width	
Sensors:	Glass-filled nylon, alumina-based ceramic, silicon, gold, epoxy	Response rime:	change) for analog outputs, 50 msec (to 63% of step step change) for frequency and pulse outputs	
Flow Body Internals:	Anodized aluminum or stainless steel, viton or	Alarms:	2 independent open-collector outputs (high/low flow rate) with corresponding LEDs	
Enclosure Rating:	Type 4	Open-Collector Rating:	30VDC at 50 mA	
Display:	4-digit LCD digital display, 0.35" high	Electrical		
Approvals:	CE, CSA, Intrinsic Safety (all classes and	Connection:	4- or 7-conductor shielded pigtail cable	
Nate 1. Most of the area	uvisions) with proper zener barrier	Supply Voltage:	10-30 VDC is standard 12-24 VDC for Intrinsically Safe	
shifts. Accuracy can be	improved by re-zeroing the meter at operating		7.2-9 VDC for battery-operated units (See Note 3)	

pressure or calibrating at the specific pressure.

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

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 3: Battery-operated units require a standard 9V alkaline battery and will operate for over 100 hours continuously. An On/Off switch allows the user to turn the power off, thus conserving the battery life. These flowmeters have no output signal.

Supply Current:

How To Order Flowstream for a Single Gas

Select the appropriate symbols to build a model code:



OUTPUT	•
Digital V	isual 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 19B	= 0-1000 HZ with 2 alarms
X 20A	= 200-1200 HZ
X 20B	= 200-1200 HZ with 2 alarms
X 22A	 pulse out (rate varies with size)
X 40A	 visual readout only (battery powered)
No Visua	al 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
Z22A	= pulse out (rate varies with size)

SPECIAL OPTIONS		
CABLE LENGTH		
10 feet of cable <i>NOTE: 3 feet is standard</i>	=	D10
CLEAN FOR OXYGEN SERVICE	=	C1
CALIBRATE ON ACTUAL GAS		
Argon	=	R
Nitrogen	=	Ν
Helium	=	HE
Carbon Dioxide NOTE: Consult foactory for other ga mixes	= ISSE	CO2 es and
CALIBRATE AT SPECIFIC PRESS	URI	E IN PSIA
NOTE: Select any specific pressure between 10 and 100 PSIA		
EX: Optimize for 10 PSIA pressure	=	P10
Optimize for 45 PSIA pressure	=	P45
VACUUM USE (7.35 to 14.7PSIA)	=	ZVAC
NOTE: Also good for for use at norn	nal j	oressures

How To Order Flowstream Multigas Series

Select the appropriate symbols to build a model code:

Example:

<u>OFM</u> - EF - <u>2M 5X2</u> - <u>X 1B</u> - D10 - R

SERI	ES		= OFM
	MA	TERIAL FOR METE	R BODY
	Anc 316	dized Aluminum Stainless Steel	= E = I
		SEALS	
		Viton Buna N	= F = B

MULTIGAS FLOW SELECTION CHART					
PIPE SIZE	PIPE SIZE SYMBOL	NOMINAL SIZE	AIR FLOW RATE MAXIMUM		
			SCCM	SCFH	
1/4 inch	2	M 5X2	500	1.09	
	2	M 1X5	2000	4.38	
			SLPM	SCFH	
	2	M 2	18	40	
	2	M 4	37	80	
	2	M 6	55	120	
	2	M 8	73	160	
	2	M 10	91	200	
	2	M 12	110	240	
	2	M 14	128	280	
3/8 inch	3	M 15	137	300	
	3	M 20	183	400	
	3	M 25	228	500	
1/2 inch	4	M 30	274	600	
	4	M 40	365	800	
	4	M 50	457	1000	
	4	M 60	548	1200	
3/4 inch	6	M 60	822	1800	
	6	M 62	850	1860	
	6	M 64	877	1920	
	6	M 66	905	1980	
	6	M 68	932	2040	
	6	M 70	959	2100	
	6	M 72	987	2160	

Example: selecting 2M6 would result in a flowmeter reading to 55 SLPM maximum air and reading of Argon, Helium, Hydrogen, CO2 and Oxygen would also be field selectable by following a menu.

MULTIPLIERS FOR FIELD SELECTED GASSES

Gas Number	Gas	Multiplier	Accuracy Degredation (+/-)
1	Air	1.00	0.0%
2	Argon	0.82	0.2%
3	CO2	1.23	1.0%
4	Helium	0.92	1.0%
5	Hydrogen	2.05	0.0%
6	Methane	1.65	0.5%
7	Nitrogen	0.97	0.0%
8	Oxygen	0.90	0.5%

For example, selection of a nominal flow size 3M15 would read to a maximum of 300 SCFH of air and would also read to 247 SCFH Argon with additional inaccuracy or .2%

NOTE: These multipliers are to help size and choose the appropriate flow meter. Each gas is displayed directly on the flow meter.



Universal Flow Monitors, Inc.

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X1A	= 4-20mA
X1B	= 4-20mA with 2 alarms
X2A	= 4-20mA IS
X4A	= 0-5 VDC
X4B	= 0-5 VDC with 2 alarms
X5A	= 0-10 VDC
X5B	= 0-10 VDC with 2 alarms
X12A	= 1-5 VDC
X12B	= 1-5 VDC with 2 alarms
X14A	= 2-10 VDC
X14B	= 2-10 VDC with 2 alarms
X19A	= 0-1000 HZ
X19B	= 0-1000 HZ with 2 alarms
X20A	= 200-1200 HZ
X20B	= 200-1200 HZ with 2 alarms
X22A	 pulse out (rate varies with size)
X40A	 visual readout only battery powered
SPECIA	AL OPTIONS
CABLE	LENGTH
10 feet	of cable = D10
NOTE:	3 feet is standard
CLEAN	FOR OXYGEN SERVICE = C1
CALIB	RATE ON ACTUAL GAS
Argon	= R
Nitroge	n = N
Helium	= HE
Carbon	Dioxide = CO2
NOTE:	Consult foactory for other gasses and

CALIBRATE AT SPECIFIC PRESSURE IN PSIA

NOTE: Select any specific pressure between 10 and 100 PSIA

mixes

EX: Optimize for 10 PSIA pressure = P10 Optimize for 45 PSIA pressure = P45

VACUUM USE (7.35 to 14.7PSIA) = ZVAC

NOTE: Also good for for use at normal pressures