

# Mass Flow Meters for Corrosive and Toxic Gases

## FEATURES

- Direct monitoring of mass flow rate eliminates need for ancillary pressure and temperature sensing
- Stainless-steel flow body accommodates most corrosive and toxic gas applications
- Digital display of mass flow rate on flow body or in remote version for panel mounting
- Electronic output of mass flow rate for control or data-logging
- Large, straight sensor tube reduces contamination and maintenance down-time
- Platinum sensor eliminates zero drift and ensures long-term repeatability
- Primary standard calibration ensures starting point accuracy and NIST traceability
- CE Approved



[www.sierrainstruments.com](http://www.sierrainstruments.com)



TopTrak<sup>®</sup> 822S / 824S



## DESCRIPTION

**S**ierra Instruments' TopTrak™ 820S is designed for precise measurement of any process gas in ranges from 0 to 10 sccm to 0 to 500 slpm. Because all wetted materials are 316 stainless steel, the device accommodates most clean gases, including corrosives.

The 820S measures and displays the mass flow rate directly in any user defined gas mass units. The instrument display is tiltable over 180° for easy viewing and can be removed for remote panel mounting. A 0 to 5 VDC or 4 to 20 mA linearly output signal proportional to gas mass flow rate is provided for recording, data-logging or control.

TopTrak's outstanding accuracy is a function of a high-stability platinum flow sensor. This sensor has been continuously tested for over two years. The maximum deviation (drift) during that time was less than 0.5%. The sensor's large internal diameter also prevents the clogging and contamination often associated with capillary type thermal mass flow meters.

TopTrak's broad range of sizes, electronics, process connections and input/output options provide flexibility, versatility and ultimately, the ideal instrument package for your specific application.

The information contained herein is subject to change without notice.

**LOW FLOW BODY**

**MEDIUM FLOW BODY**

**HIGH FLOW BODY**

FLOW RANGE		
	0 to 10 sccm	0 to 15 slm
Process Tubing	.25 (6.4)	.25 (6.4)

FLOW RANGE, slm		
	0 to 15	0 to 100
Process Tubing	.25 or .375 (6.4 or 9.5)	.25 or .375 (6.4 or 9.5)

FLOW RANGE, slm		
	0 to 100	0 to 500
Process Tubing	.375 or .5 (9.5 or 12.7)	.50 (12.7)

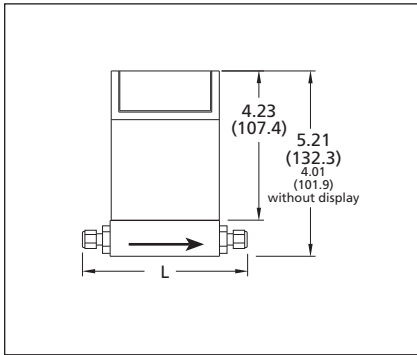
Fitting Type, .562-18 Thread <sup>(1)</sup>			
	Compression .125 or .25	VCO (male) .25	VCR (male) .25
Dim. L	4.84 or 5.0 (122.9 or 127.0)	4.60 (116.8)	4.90 (124.5)

Fitting Type, .562-18 Thread <sup>(1)</sup>			
	Compression .25 or .375	VCO (male) .25 or .375	VCR (male) .25 or .375
Dim. L	6.27 or 6.39 (159.3 or 162.3)	5.81 or 6.25 (147.6 or 158.8)	6.13 or 6.43 (155.7 or 163.3)

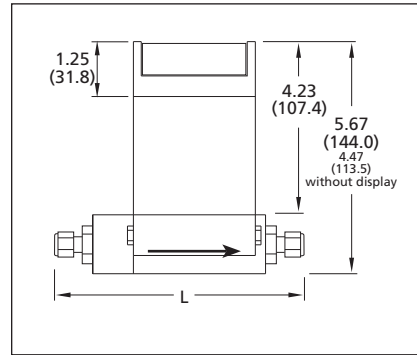
Fitting Type, .75-16 Thread <sup>(1)</sup>			
	Compression .375 or .50	VCO (male) .375	VCR (male) .375
Dim. L	11.89 or 12.17 (302 or 309.1)	11.75 (298.5)	12.19 (309.6)

Note: (1) Metric fittings are available, consult factory.

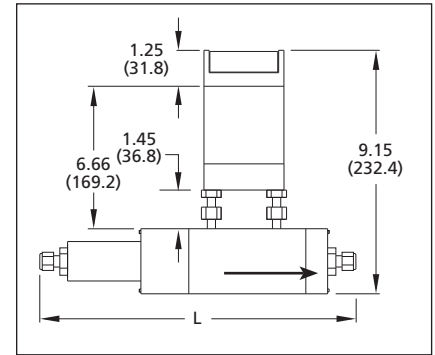
Model 820S—Side View



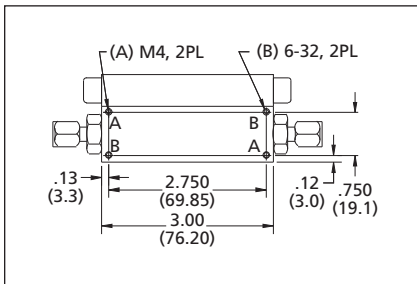
Model 820S—Side View



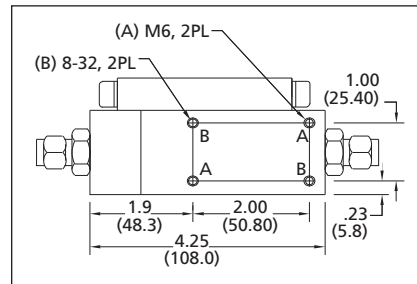
Model 820S—Side View



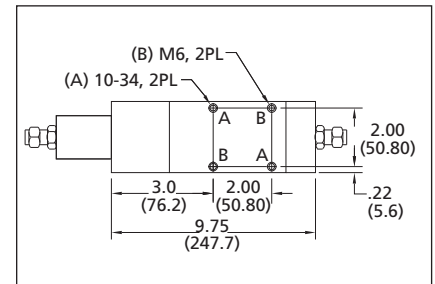
Model 820S—Bottom View



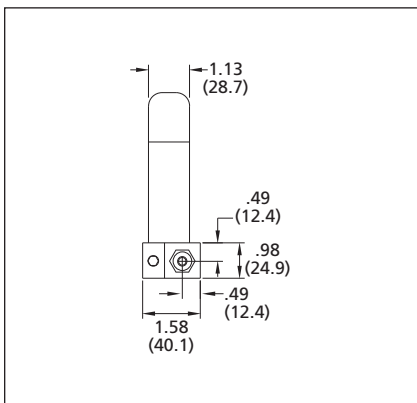
Model 820S—Bottom View



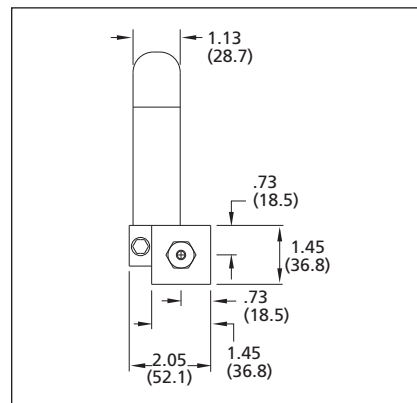
Model 820S—Bottom View



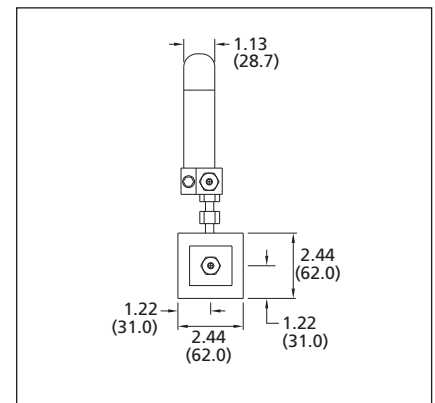
Model 820S—Outlet View



Model 820S—Outlet View



Model 820S—Outlet View



All dimensions are inches. Millimeters are in parentheses. Certified drawings are available on request.

## PERFORMANCE SPECIFICATIONS

### Accuracy

± 1.5% of full scale under calibration conditions including linearity over 15° to 25°C and 5 to 60 psia (0.3 to 4 bara)

If the meter is mounted with a vertical (up or down) flow path the following accuracy de-rating applies:

Operating Pressure			
Inlet Pressure Deviation <sup>2</sup>	50 psig	100 psig	150 psig
± 1 psig	± 1.5% of full scale	± 1.5% of full scale	± 1.5% of full scale
± 5 psig	± 3.8% of full scale	± 4.5% of full scale	± 5.3% of full scale
± 10 psig	± 6% of full scale	± 7.5% of full scale	± 9% of full scale

Notes: (1) Do not exceed 150 psig. (2) Difference between inlet pressure and calibrated pressure. Do not exceed ± 10 psig.

### Repeatability

± 0.5% of full scale

### Temperature Coefficient

0.08% of full scale per °F (0.15% of full scale per °C), or better

### Pressure Coefficient

0.01% of full scale per psi (0.15% of full scale per bar) or better

### Response Time

800 ms time constant; six seconds (typical) to within ± 2% of final value over 25 to 100% of full scale

## OPERATING SPECIFICATIONS

### Gases

Most gases; check compatibility with wetted materials; specify when ordering

### Mass Flow Rates

0 to 10 sccm to 0 to 500 slpm; flow ranges specified are for an equivalent flow of nitrogen at 760 mm Hg and 21°C (70°F); other ranges in other units are available (e.g., scfh or nm<sup>3</sup>/h)

### Gas Pressure

500 psig (34 barg) maximum;  
For pressures > 500 psig (34 barg), consult C100/M100 HP SmartTrak  
30 psig (2 barg) optimum

### Gas & Ambient Temperature

32 to 122°F (0 to 50°C)

### Leak Integrity

5 X 10<sup>-9</sup> atm cc/sec of helium maximum

### Power Requirements

12 to 15 VDC, 15 VDC nominal, 100 mA maximum  
24 VDC optional, specify when ordering

### Output Signal

Linear 0–5 VDC, 1000 ohms minimum load resistance  
Linear 4–20 mA, 500 ohms maximum loop resistance

### Display (optional)

3.5 digit LCD (0.6 in H); removable for remote mounting

## PHYSICAL SPECIFICATIONS

### Wetted Materials

316 stainless steel, Viton® "O"-rings standard  
Neoprene® and 4079 Kalrez® "O"-rings optional

### Options

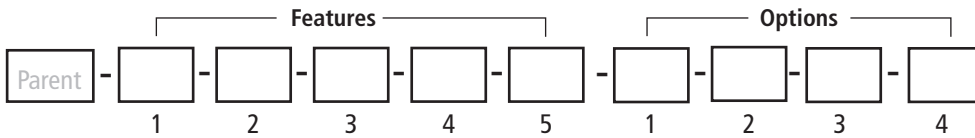
See "Price List" for available CE options

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## PRESSURE DROP ACROSS THE 820S

Flow Meter	Flow rate	psi			Mbar		
		1/4	3/8	1/2	1/4	3/8	1/2
Meter Fittings (inch) →		1/4	3/8	1/2	1/4	3/8	1/2
820S	100 sccm	.005	n/a	n/a	.309	n/a	n/a
820S	500 sccm	.006	n/a	n/a	.440	n/a	n/a
820S	1 slpm	.006	n/a	n/a	.475	n/a	n/a
820S	15 slpm	.11	.06	n/a	7.59	4.0	n/a
820S	20 slpm	.08	.03	n/a	5.50	2.0	n/a
820S	50 slpm	n/a	.3	.10	n/a	20.4	6.8
820S	100 slpm	2.0	.85	.30	136	58	20.4
820S	200 slpm	n/a	2.50	2.00	n/a	170	136
820S	500 slpm	n/a	n/a	8.5	n/a	n/a	578

## ORDERING INFORMATION



Instructions: To order a 820S/840 please fill in each number block by selecting the codes from the corresponding features below and following pages.

Parent Number	
<b>822S</b>	Top-Trak® Mass Flow Meter with Display. Flow body and sensor constructed of 316 stainless steel, Viton® "O"-rings. 3.5 digit LCD display. Linear, 0-5 VDC output signal; input power 12-15 VDC. 9 Pin "D" mating connector and 1/4-inch fitting. Calibrated for flow ranges from 0-10 sccm to 0-500 slpm equivalent nitrogen flow; 1.5% full scale accuracy; maximum temperature 122°F (50°C); maximum pressure 500 psig (34.5 barg) for horizontal orientation; maximum pressure 150 psig (10.3 barg) for vertical orientation. CE Approved.
<b>824S</b>	Top-Trak® Mass Flow Meter. Same as above with no display.

Feature 1: Flow Body*	
<b>L</b>	822S-L with display (0-10 sccm up to 0-15 slpm)
<b>L</b>	824S-L without local display (0-10 sccm up to 0-15 slpm)
<b>M</b>	822S-M with display (0-15 slpm up to 0-100 slpm) (also see M100M)
<b>M</b>	824S-M without local display (0-15 slpm up to 0-100 slpm)
<b>H</b>	822S-H with display (0-100 slpm up to 0-500 slpm) (also see M100H)
<b>H</b>	824S-H without local display (0-100 slpm up to 0-500 slpm)

Feature 2: Fittings	
<b>1</b>	1/8-inch compression. For low flow bodies (maximum 5 slpm)
<b>2</b>	1/4-inch compression. For low and medium flow bodies (maximum 50 slpm)
<b>3</b>	3/8-inch compression. For low, medium and high flow bodies (maximum 300 slpm)
<b>4</b>	1/2-inch compression. For medium and high flow bodies
<b>5</b>	1/4-inch VCO. For low and medium flow bodies (maximum 50 slpm)
<b>6</b>	1/2-inch VCO. For low and medium flow bodies
<b>7</b>	1/2-inch VCO. For high flow bodies. (maximum 300 slpm)
<b>8</b>	1/4-inch VCR. For low and medium flow bodies (maximum 50 slpm)
<b>9</b>	1/2-inch VCR. For low, medium and high flow bodies
<b>10</b>	6 mm compression. For low and medium flow bodies (maximum 50 slpm)
<b>11</b>	10 mm compression. For medium and high flow bodies
<b>12</b>	12 mm compression. For medium and high flow bodies
<b>13</b>	1/4-inch FNPT adapter bushing. For low and medium flow bodies
<b>14</b>	3/8-FNPT. For low and med flow bodies only.

NOTE: ALL SLPM FLOW RANGES ALSO AVAILABLE IN NLPMM

Feature 3: Elastomers	
<b>OV1</b>	Viton®. For low, medium and high flow bodies
<b>ON1</b>	Neoprene®. For low and medium flow bodies
<b>ON2</b>	Neoprene®. For high flow bodies
<b>OK1</b>	Kalrez®. For low flow bodies
<b>OK2</b>	Kalrez®. For medium flow bodies
<b>OK3</b>	Kalrez® For high flow bodies

Feature 4: Input Power	
<b>PV1</b>	12-15 VDC
<b>PV2</b>	24 VDC

Feature 5: Output Signal	
<b>V1</b>	0-5 VDC, linear
<b>V4</b>	4-20 mA, linear

Option 1: Special Cals	
<b>HP*</b>	High pressure calibration. 100-500 psig maximum (6.9-34.5 barg)
<b>MP</b>	Medium pressure calibration. 40-100 psig (2.8-6.9 barg)
<b>LF</b>	Low Flow calibration. Required for 0-20 sccm full scale flow range or less

\* Maximum pressure 150 psig (10.3 barg) for vertical flow orientation.

Option 2: Certificates	
<b>MC</b>	Material certificates--US Mill certs on all wetted flow body parts
<b>CC</b>	Certificate of conformance

Option 3: O2 Cleaning	
<b>O2C</b>	O2 Cleaning. Includes certification. Product cleaned for O2 service. Inspected with ultra-violet light, double-bagged prior to shipment.

Option 4: Display	
<b>RD( )</b>	Remote Display. Maximum 100 feet available on Models 822S. Specify cable length in parentheses, \$1 per foot. Instruments ordered with remote display are not CE compliant
<b>T</b>	Totalizer + actual flow in display (model 822S and 826)