

# 5850EM Series

## Metal Sealed, Thermal Mass Flow Controllers & Meters for High-Pressure Gas Flows

The 5850EM Series metal sealed mass flow controllers and meters have all the features of the standard 5850E Series plus all metal seals for outstanding leak integrity and cleanliness. This eliminates the need for continuous monitoring and readjustment of gas pressures to provide a stable mass flow. The heart of this platform is the highly stable sensor which produces an electrical output signal linear with flow rate. This signal is used for indicating, recording and/or control purposes without the need for an auxiliary auto-zero circuit. Model 5851EM specifically supports high-flow gas measurement and control. It combines the high leak integrity of metal seals with a variety of options for maximum flexibility.



### Features

High Leak Integrity

Insensitive to Mounting Attitude

Optional Enhanced Process (5 Ra avg.) Internal Finish

High Purity VAR 316L Stainless Steel

Industry-Leading Long-Term Sensor Stability

Superior Valve Technology

### Benefits

Less than  $10^{-10}$  atm-cc/sec He leak rate ensures no escape of hazardous gases.

Increased flexibility allows for easy design

Ensures compatibility with high-purity applications

Improves lifetime and lowers cost of ownership when used with aggressive gases

Increased system uptime and reduced cost of ownership by reducing maintenance and eliminating periodic recipe adjustments and/or recalibrations

Minimum leak-by, wide turndown, and superior corrosion resistant materials reduces overall gas panel cost

# Product Specifications

	5850EM	5851EM
<b>Performance</b>		
Flow Ranges <sup>1</sup>	Any range from 0-3 sccm to -30,000 sccm Nitrogen eq. Lower flows available, consult factory	Any full scale flow from 10 slpm to 100 slpm Nitrogen eq., up to 200 slpm H <sub>2</sub> .
Control Range	2 - 100% with elastomeric valve seat 3 - 100% with metal or Teflon® valve seat	50 - 1 with elastomeric valve seat
Repeatability	0.25% of rate	
Accuracy	1% full scale including linearity, at calibration conditions 1.5% full scale including linearity, for flow ranges > 20 slpm	±1% full scale including linearity at calibrated conditions
Settling Time	< 3 seconds to within 2% of full scale of final value for a 0 - 100% command step with normally closed valve <sup>2</sup>	
Mounting Attitude Sensitivity	Available in any position 0.5% max. full scale deviation after rezeroing	±0.5% full scale max. deviation from specified accuracy after rezeroing
Temperature Sensitivity	Zero: < ±0.075% full scale per °C; Span: < ±1.0% full scale shift over 10 - 50 °C range	
Pressure Sensitivity	0.008% per psi Nitrogen	±0.03% per psi up to 150 psig Nitrogen

## Ratings

Operating Pressure	1,500 psi (10,342 MPa) max. Note (5850EM): 500 psi with stainless steel fastener	
Differential Pressure	Valve orifice sized for any pressure drop between 5 - 50 psi (minimum pressure drop depends on gas and range - consult factory)	
(PED) Pressure Equipment Directive (97/23/EC)	As Sound Engineering Practice (SEP)	
Ambient Temperature Limits	Operating: 40 °F to 150 °F (5 °C to 65 °C) Non-operating: -13 °F to 212 °F (-25 °C to 100 °C)	41 °F to 149 °F (5 °C to 65 °C)
Leak Integrity	Inboard to outboard 1x10 <sup>-10</sup> atm. cc/sec He max.	

## Electrical

Electrical Connections	15-pin D-Connector (DA-15P)	
Command Input	Voltage Option: 0 - 5 Vdc (input resistance 40 k ohm min.)	0 - 5 Vdc (200 k ohms input resistance)
Output Signal	Voltage Option: 0 - 5 Vdc into 2,000 ohms minimum	0 - 5 Vdc (Max load 2 k ohms) ±0.2% Reference (max load 2 k ohms)
5 Volt Reference Output	5 Volts. ± 0.01 Vdc into 2,000 ohms minimum	
Power Requirements	Voltage Option: N.C. Valve (or N.O. Valve with less than 2.5 slpm); 3.25 watts max; +15 Vdc @ 35 mA - 15 Vdc @ 180 mA N.O. Valve with flow rate greater than 2.5 slpm: 10.5 watts max., +15 Vdc @ 350 mA, -15 Vdc @ 350 mA	±15 Vdc (±5%) at 350 mAdc, 10.5 watts
Power Supply Sensitivity	None within ±5% of specified voltage (See Power Requirements)	±0.09% full scale over total power supply voltage ±15 Vdc (±5%) at 350 mAdc 10.5 watts power consumption
EMC Directive (89/336/EEC)	Per 61326	

## Mechanical

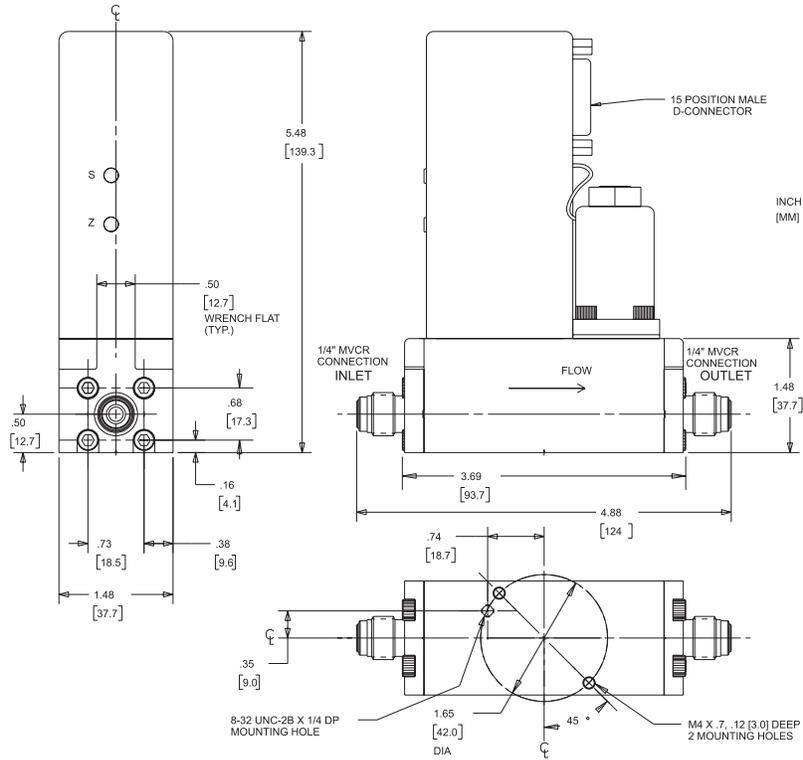
Process Connections	1/4" Tube VCR®	Integrally welded to body: Standard: 1/4" VCR® with 0.250" bore Optional: 3/8" - 1/2" VCR
Materials of Construction	316L VAR (Vacuum Arc Remelt), 316L, and high alloy ferritic stainless steel	
External Seals:	Nickel 200	
Internal Seals:	Nickel 200	
Valve Seat:	316L, Viton® fluoroelastomers, Buna-N, Kalrez® or Teflon®	

<sup>1</sup> Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials International: Standard: 0 °C and 101 kPa (760 Torr).

<sup>2</sup> Per SEMI Guideline E17-91

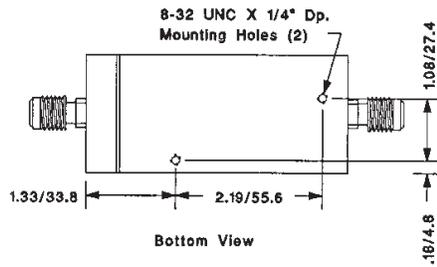
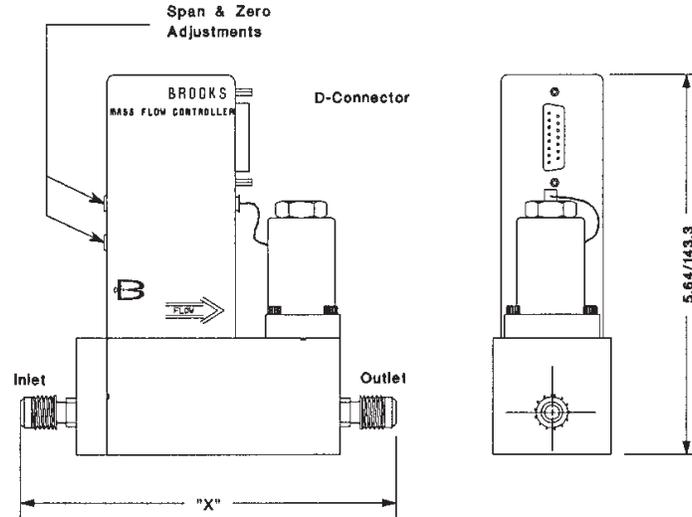
## 5850EM

5850EM D-Connector, Tubing Connections (Ref. No. KR-5850-110)



## 5851EM

5851EM D-Connector, Tubing Connections



Connection Type	Dim X*
1/4" Tube VCR	5.57in [141.1mm]
3/8" Tube VCR	6.64in [168.7mm]
1/2" Tube VCR	6.64in [168.7mm]

\*Mating Surface to Mating Surface

Brooks is committed to assuring all of our customers receive the ideal pressure controllers for their application, along with outstanding service and support to back it up. We operate first class repair facilities located around the world to provide rapid response and support. Each location utilizes primary standard calibration equipment to ensure accuracy and reliability for repairs and recalibration and is certified by our local Weights and Measures Authorities and traceable to the relevant International Standards.

Visit [www.BrooksInstrument.com](http://www.BrooksInstrument.com) to locate the service location nearest to you.

### START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required. For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

### SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users, and maintenance persons. Please contact your nearest sales representative for more details. Due to Brooks Instrument’s commitment to continuous improvement of our products, all specifications are subject to change without notice.



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Data-Sheet-5800EM-EN/2024-04

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