Data Sheet
DS-TMF-5851i-MFC-eng
October, 2008

Industrial High Flow Mass Flow Controller

Description

The Brooks® Model 5851*i* Mass Flow Controller accurately measures and controls gas flow. The heart of the system is the removable flow sensor which produces an electrical output signal linear with flow rate used for indicating, recording, and/or control purposes. It eliminates the need for continuous monitoring and readjustment of gas pressures to provide a stable gas flow.

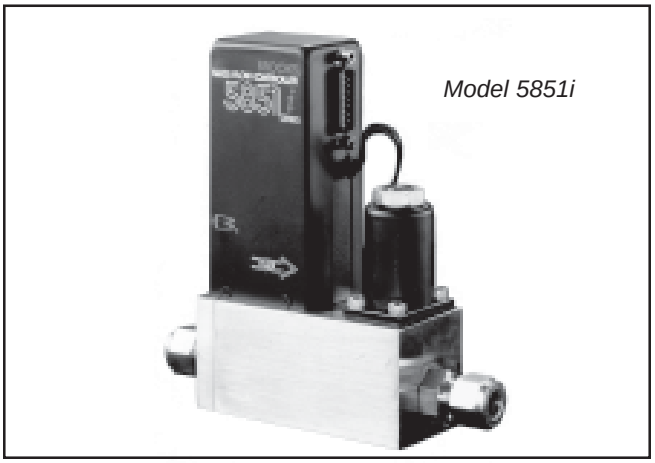
Design Features

- Easy maintenance
- Negligible flow overshoot/undershoot
- Removable sensor
- Insensitive to mounting attitude
- Wide flow range (up to 100 slpm N_2, 200 slpm H_2)
- End accessible zero and span potentiometers
- Jumper selectable soft start
- Electrically activated valve override
- Low command flow cutoff
- Normally closed valve
- Corrosion resistant valve
- Dual analog signal output 0-5 Vdc and 4-20 mA or 0-20 mA
- User configurable set point input 0-5 Vdc, 4-20 mA
- Wide power supply tolerance, 22-28 Vdc
- Subminiature D-connector electrical interface for RFI immunity

Principle of Operation

The operating principle of the Brooks Mass Flow Controller is thermodynamic. A precision power supply directs heat to the midpoint of the sensor tube carrying a constant percentage of flow. On the same tube equidistant upstream and downstream of the heat input are resistance temperature measuring elements.

With no flow, the heat reaching each temperature element is equal. With increasing flow, the flow stream carries heat away from the upstream element, T1, and an increasing amount towards the downstream element, T2. An increasing temperature difference develops between the two elements, and this difference is proportional to the mass flow rate. A bridge circuit interprets the temperature differential and an amplifier provides the output to the control circuitry as well as 0-5 Vdc output signal.



The control circuitry compares the command setpoint to the flow signal and positions the precision solenoid control valve. When the command signal is below 1% of full scale, the control valve is positioned fully closed. The control valve can be latched fully open or closed by activating the valve override circuit.

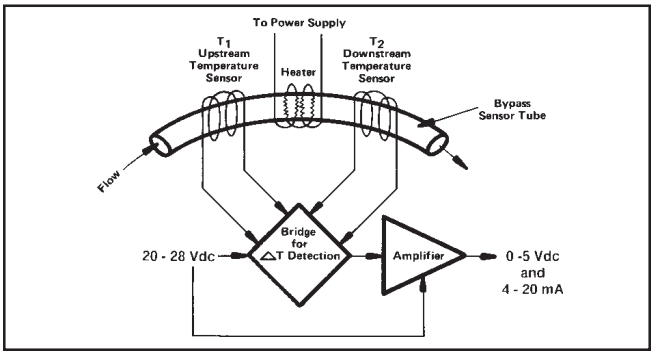


Figure 1 Principle of Operation

Specifications

Flow Ranges

Any full scale flow rate from 10 slpm* to 100 slpm nitrogen equivalent, up to 200 slpm H_2.

***Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials Institute) standard: 0°C and 101 kPa (760 Torr). The mass flow controller can be calibrated to other reference standard conditions. Specify at time of ordering.**

Ratings

Maximum Operating Pressure: 1500 psig; 10-50 psid pressure drop (minimum pressure drop depends on gas and range)

Temperature: Ambient/gas 40 to 150°F (5 to 65°C)

Model 5851*i*

Specifications (continued)

Performance

Accuracy: ±1% full scale including linearity at calibrated conditions.

Repeatability: 0.25% of rate

Response Time: Less than 6 seconds to within 2% of full scale of final value for a 0 to 100% command change.

Control Range: 50 to 1

Sensitivity to Mounting Attitude: ±0.5% F.S. maximum deviation from specified accuracy after rezeroing under 200 psig. Specify mounting attitude at time of order to insure optimum performance.

Temperature Sensitivity

Zero: Less than ±0.075% F.S. per degree C
Span: Less than ±1.0% F.S. shift from original calibration over 10-50°C range

Pressure Sensitivity: ±0.03% per psi up to 200 psig (N_2)

Set Point Command Signal Requirements

0 to 5 Vdc (200 k ohms input resistance) or 4-20 mA (75 ohms input resistance)

Output: 0 to 5 Vdc into 2000 ohm (or greater) load; maximum ripple 3 mV and 4-20 mA or 0-20mA, 650 ohms maximum resistance

Leak Integrity: 1 x 10^{-9} atmosphere scc/sec. Helium

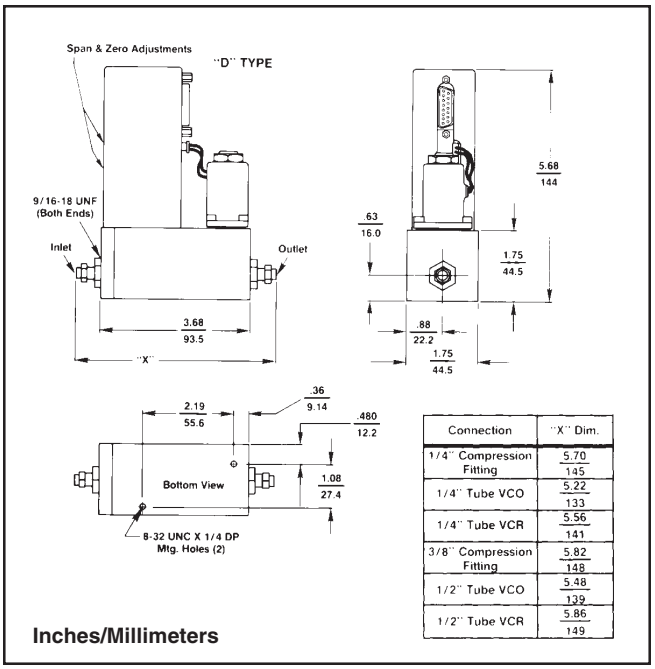
Power Requirements

+22 to 28 Vdc, 290 mA @ 20 Vdc, 370 mA @ 28 Vdc

Materials of Construction

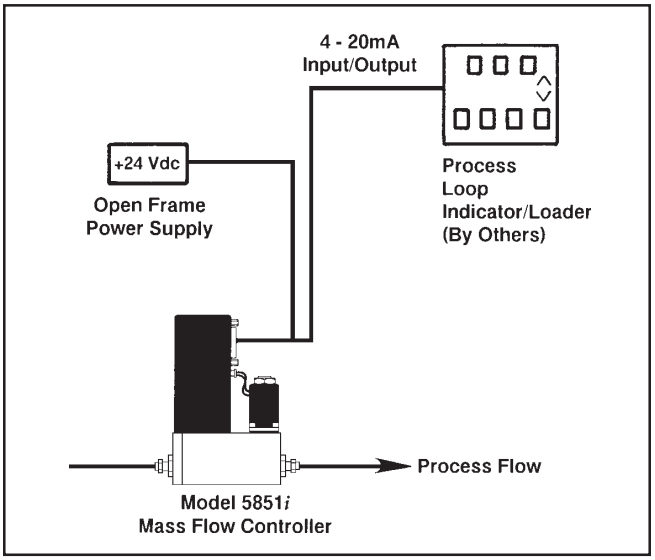
Wetted Parts - Standard: Stainless Steel with Viton® fluoroelastomers or Buna-N; Optional: Kalrez®
Connections - Standard: 9/16-18 UNF with Stainless Steel Compression Fittings; Optional: VCO™ and VCR™

Electrical Connections: D-type connector (DA-15P).



Connection	"X" Dim.
1/4" Compression Fitting	5.70 145
1/4" Tube VCO	5.22 133
1/4" Tube VCR	5.56 141
3/8" Compression Fitting	5.82 148
1/2" Tube VCO	5.48 139
1/2" Tube VCR	5.86 149

Dimensions



Typical Configuration

TRADEMARKS
Brooks ..... Brooks Instrument, LLC
Kalrez ..... E.I. DuPont de Nemours & Co.
Viton ..... DuPont Performance Elastomers
VCO ..... Cajon Co.
VCR ..... Cajon Co.

Specifications Subject to Change Without Notice

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ISO 9001 QUALITY SYSTEM

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