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## Data Sheet

DS-TMF-5861i-MFM-eng

October, 2008

# Industrial Mass Flowmeter Model 5861i

## Features and Benefits

- Mass flow measurement
- Fast response - flow signal less than 6 seconds to 98% of final value
- $\pm 1\%$  full scale accuracy including linearity
- Wide flow range  
(up to 100 slpm N<sub>2</sub>, 200 slpm H<sub>2</sub>)
- Repeatability:  $\pm 0.25\%$  of rate
- Linear output signal, 0-5 Vdc and 4-20 mA or 0-20 mA
- All wetted parts are 316 stainless steel
- No moving parts
- All solid state electronics
- Compact
- Removable sensor
- Insensitive to mounting attitude
- 15-28 Vdc powered
- Subminiature D-connector electrical interface for RFI immunity

## Description

The Brooks® Model 5861i Mass Flowmeter accurately measures gas flow. The heart of the system is the flow sensor which produces an electrical output signal linear with mass flow rate used for indicating and/or recording. Both 0-5 Vdc and 4-20 mA or 0-20 mA linear output signals are available for flexibility in interfacing with readout equipment. Many options are offered to provide a versatile system of mass flow measurement.

## Principle of Operation

The operating principle of the Brooks Mass Flowmeter 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 a 0-5 Vdc, 4-20mA or 0-20 mA linear output signal.

## Specifications

### Flow Ranges:

Any full scale flow rate from 10 slpm\* to 100 slpm, Nitrogen equivalent, (200 slpm H<sub>2</sub>)

\*Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials Institute) standard: 0°C and 101.3 kPa (760 Torr).

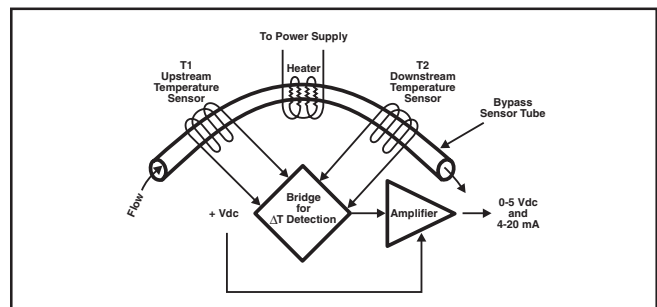
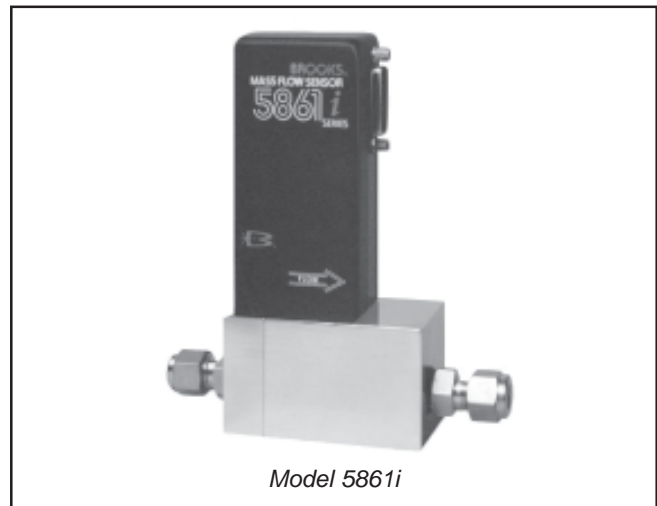


Figure 1 Principle of Operation

## Ratings:

Maximum Operating Pressure: 1500 psi (103 bar)

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

Non-operating: -13°F to +212°F (-25°C to 100°C)

## Performance:

Accuracy:  $\pm 1\%$  full scale including linearity at calibrated conditions

## Repeatability:

0.25% of rate

## Response Time:

Less than 6 seconds

## Control / Usable Range:

50 to 1

## Sensitivity to Mounting Attitude:

$\pm 0.5\%$  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  $\pm 0.075\%$  F.S. per degree C

Span: Less than  $\pm 1.0\%$  F.S. shift from original calibration over 10-50°C range

# Model 5861i

## Specifications (continued)

### Pressure Sensitivity:

0.03% per PSI up to 200 PSIG

### Power Supply Sensitivity:

Negligible over the allowable voltage range

### Output Signal:

0 to 5 Vdc into 2000 ohms (or greater) load. Maximum ripple 3 mV. 0/4-20 mA, max. loop resistance is power supply dependent, 500 ohms maximum loop resistance.

### Leak Integrity:

1 x 10<sup>-9</sup> atmosphere scc/sec. Helium

### Power Requirements:

+15 to +28 Vdc @ 90 mA

## Materials of Construction

Fittings and Transducer Assy. - Wetted parts 316 SS  
O-rings and Gaskets - Standard: Viton® fluoroelastomers and Buna-N; Optional: Kalrez®

## Electrical Connections:

D-connector, 15-pin type (DA-15P)

## Accessories

- Model 0151: Power Supply/Indicator
- Model 0152/54: Power Supply/Indicator (2 or 4 meters)
- Inlet Filters
- Open Frame Power Supplies

## Ordering Information

- A. Flow sensor
  1. Type of gas to be metered
  2. Operating temperature and pressure of gas
  3. Flow range
  4. Inlet and outlet connections
- B. Power Supply
- C. Indicator (digital)
- D. With or without interconnecting cable
- E. Additional accessories

## TRADEMARKS

Brooks ..... Brooks Instrument, LLC  
Kalrez ..... DuPont Dow Elastomers  
VCO ..... Cajon Co.  
VCR ..... Cajon Co.  
Viton ..... DuPont Performance Elastomers

Specifications subject to change without notice.

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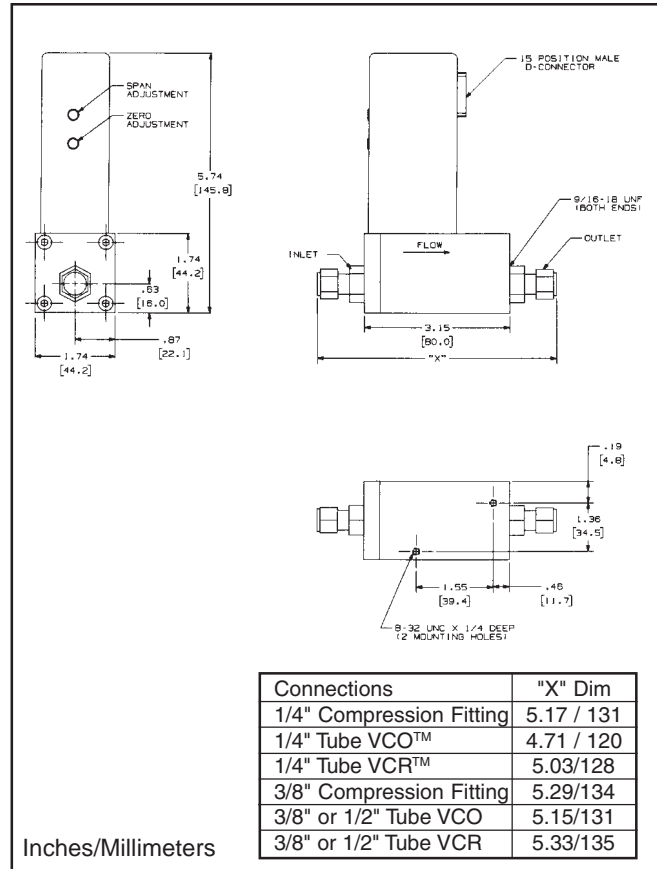


Figure 1 Dimensions, Model 5861i

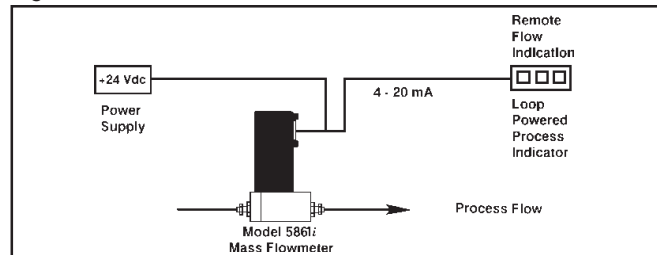


Figure 2 Typical Configuration



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