

Data Sheet

DS-TMF-5861E-MFM-eng

October, 2008

Mass Flowmeter Model 5861E

Features and benefits

- Mass flow measurement
- Fast response - flow signal less than 3 seconds to 98% of final value
- $\pm 1\%$ full scale accuracy including linearity
- Wide flow range
(up to 100 slpm N_2 , 200 slpm H_2)
- Repeatability: $\pm 0.25\%$ of rate
- Linear output signal, 0-5 Vdc
- All wetted parts are 316 stainless steel
- No moving parts
- All solid state electronics
- Compact
- Removable sensor
- Insensitive to mounting attitude

Description

The Brooks® Model 5861E 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. This signal is used for indicating and/or recording. 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 linear output signal.

Specifications

Flow Ranges

Any full scale flow rate from 10 slpm* to 100 slpm, Nitrogen equivalent (200 slpm H_2).

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

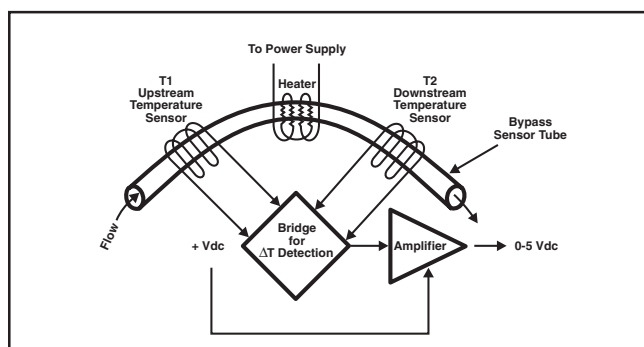
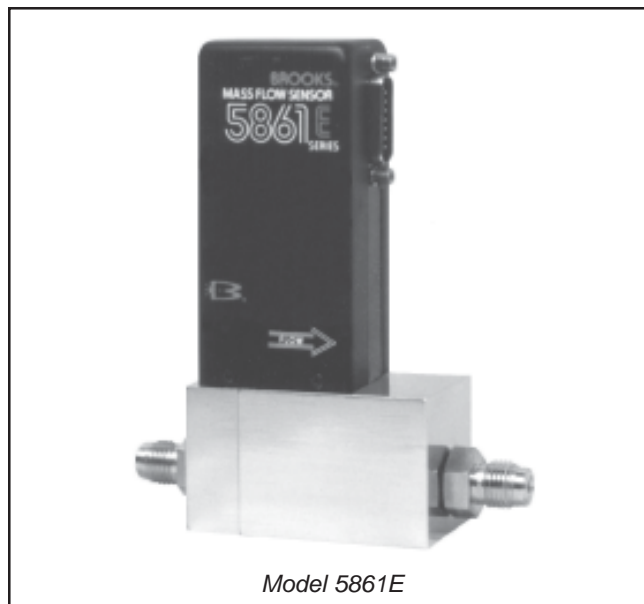


Figure 1 Principle of Operation

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 3 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

Model 5861E

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

Power Supply Sensitivity:

±0.09% full scale per % power supply voltage variation

Output Signal:

0 to 5 Vdc into 3000 ohms (or greater) load. Maximum ripple 3 mV

Leak Integrity:

1 x 10⁻⁹ atmosphere scc/sec. Helium

Power Requirements:

+15 Vdc (±5%) at 35 mA dc
 -15 Vdc (±5%) at 35 mA dc
 1.05 watts power consumption

Materials of Construction

Fittings and Transducer Assembly - Wetted parts 316 stainless steel
 O-rings and Gaskets - Standard: Viton® fluoroelastomers and Buna-N; Optional: Kalrez®

Electrical Connections:

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

Dimensions:

See Figure 2

Accessories

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

TRADEMARKS

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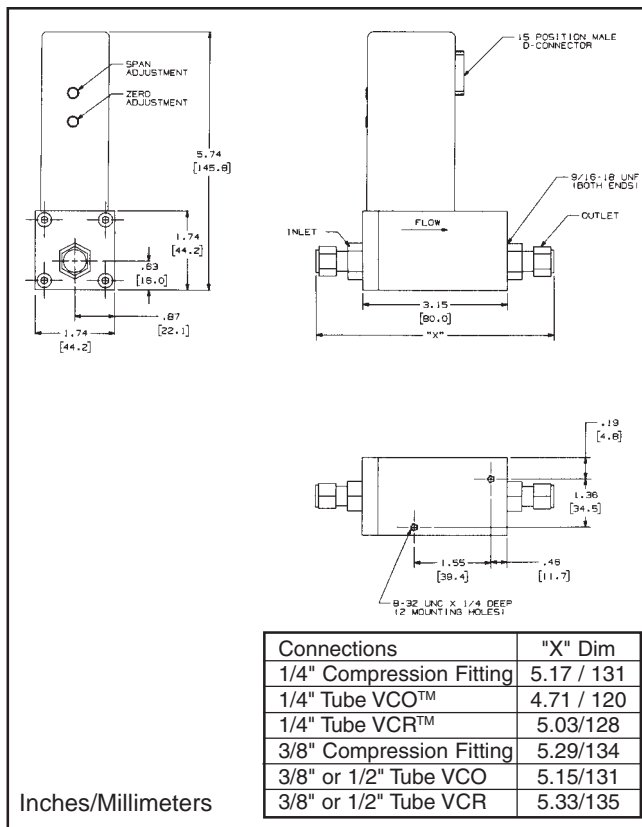


Figure 2 Dimensions, Model 5861E

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

