

IE Model 5860E Mass Flowmeters

MASS FLOWMETERS & CONTROLLERS

Description

The IE 5860E Mass Flow meter is a mass flow instrument for accurately measuring gas flows. The heart of the system is the flow sensor which produces an electrical output signal linear with flow rate used for an electrical output signal linear with flow rate used for indicating and/or recording. Many options are offered to provide a versatile system of mass flow measurement.



IE MODEL 5860E MASS FLOWMETERS

Design Features

- Mass flow measurement
- Fast Response – flow signal less than 3 seconds to 98% of final value
- +1% full scale accuracy including linearity
- Flow Rates – 0-3 sccm to 0-30 slpm
- Repeatability - +0.25% of rate
- Linear 0-5 Vdc output signal
- All wetted parts are 316 Stainless Steel
- Sensor has no moving parts
- All solid state electronics
- Compact
- Removable sensor
- Insensitive to mounting attitude

Principle Of Operation

The operating principle of the IE Mass Flowmeter is thermodynamic. A wire wound heating element directs heat to the midpoint of the bypass sensor tube. A predetermined portion of the total flow, flows through the bypass sensor tube. 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 flowstream carries heat away from the upstream element, T1, and an increasing amount towards the downstream element, T2. An increasing temperature difference is proportional to the amount of gas flowing or the mass flow rate. A bridge circuit interprets the temperature difference and an amplifier provides the 0-5 Vdc output signal

Specifications

WARNING: Do not operate this instrument in excess of the specifications listed below. Failure to heed warning may result in serious personal injury or damage to equipment. . Model 5860E Mass Flowmeter

FLOW RANGES

3 sccm to 30 slpm* (nitrogen equivalent)

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

Ratings

Maximum Operating pressure: 4500 psi (31.03 Mpa)
Temperature: Ambient Operating 40 to 150°F (5 to 65°C)
Non-operating - 13 to +212°F (-25 to 100°C)

Performance

Accuracy: $\pm 1\%$ full scale including linearity at calibrated conditions. $\pm 1.5\%$ full scale including linearity for flow ranges greater than 20 slpm.

Repeatability

0.25% of rate

Response Time

Less than 3 seconds to within 2% of full scale of final value for a 0 to 100% flow step.

Useable Range

50 to 1

Sensitivity to Mounting Attitude

$\pm 0.5\%$ F.S. maximum deviation from specified accuracy after rezeroing.

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

Power Supply Sensitivity

$\pm 0.09\%$ 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

1×10^{-9} atmosphere scc/sec. Helium

Power Requirements

+15 Vdc ($\pm 5\%$) at 35 mA dc
-15 Vdc ($\pm 5\%$) at 35 mA dc
10.5 watts power consumption

Materials of Construction

Fittings and Transducer Assembly – Wetted parts 316 Stainless Steel
O-rings and Gaskets – Standard: Viton*

Electrical Connections

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

Dimensions

See Figure 2.

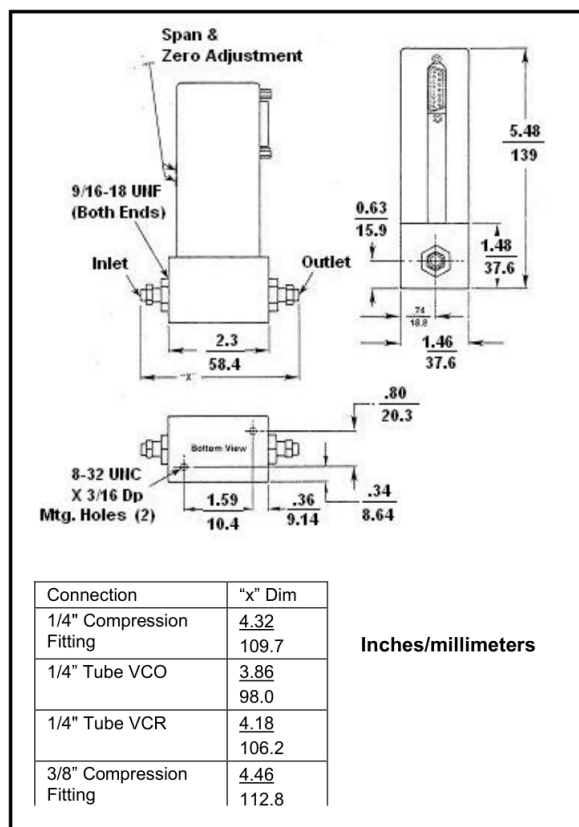


Figure 2 Dimensions

ACCESSORIES

Model 5821: Power supply to power up to 5 units
Model 5839: Digital Indicator
Model 5875: Power Supply/Indicator (upto 4 sensors)
Filters
Open Frame Power Supplies

ORDERING INFORMATION

1. Meter size
2. Liner material
3. Electrode material
4. Pressure and temperature requirements (ambient and process)
5. Flow rate (normal, maximum, minimum)
6. Electrical requirements
7. output(s) required
8. Liquid to be metered (name, conductivity)
9. Meter orientation (horizontal or vertical)
10. Accessories required

Specifications subject to change without any notice.