

MASS FLOWMETERS & CONTROLLERS

Description

The IE Model 5851E Mass Flow Controller accurately measures and controls gas flows. 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.



IE MODEL 5851E HIGH FLOW MASS FLOW CONTROLLER

Design Features

- Improved response for low command changes
- Easy maintenance
- Fast flow response to command changes
- Negligible flow overshoot/undershoot
- Removable sensor
- Insensitive to mounting attitude
- Wide flow range (up to 100 slpm N₂, 200 slpm H₂)
- End accessible zero and span potentiometers
- Jumper selectable soft start
- Electrically activated valve override
- Jumper selectable external valve control
- Low command flow cut-off
- Normally closed valve
- Corrosion resistant valve

Principle Of Operation

The operating principle of the IE Mass Flow Controller is thermodynamic. A precision power supply directs heat to the midpoint of the sensor tube carrying a constant percentage of the 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 amount of gas flowing or the mass flow rate. A bridge circuit interprets the temperature difference and an amplifier provides the output to the control circuitry as well as a 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 to fully closed. The control valve can be latched fully open or closed by activating the valve override circuit.

SPECIFICATIONS

WARNING: Do not operate this instrument in excess of the specifications listed below.

Flow Ranges

Any full scale flow rate from 10 slpm** to 100 slpm nitrogen equivalent, up to 200 slpm H₂.

**Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials Institute) standard: 0°C and 101 kPa.

Ratings

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

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

Performance

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

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% command change.

Control Range

50 to 1

Sensitivity to Mounting Attitude

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

Temperature Sensitivity

Zero: to 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.

Pressure Sensitivity

$\pm 0.03\%$ per psi up to 200 psig (N₂)

Command Input Voltage

0 to 5 VDC (200 K ohms input resistance)

Output

0 to 5 Vdc into 1000 ohms (or greater) load. Maximum ripple 3mV.

Leak Integrity

1×10^{-9} atmosphere scc/sec. Helium

Power Requirements

+15 Vdc ($\pm 5\%$) at 350 mA dc
-15 Vdc ($\pm 5\%$) at 350 mA dc
10.5 watts power consumption

Materials of Construction

Wetted Parts – Standard: Stainless Steel with Viton.
Optional: Kalrez or Buna-N.

Connections

Standard 9/16-18 UNF with Stainless Steel
Compression Fittings: Optional: VCO and VCR.

Electrical Connections

Card Edge connector (gold plated) or
D-type connector (DA-15P).

Dimensions

See Figure 2.

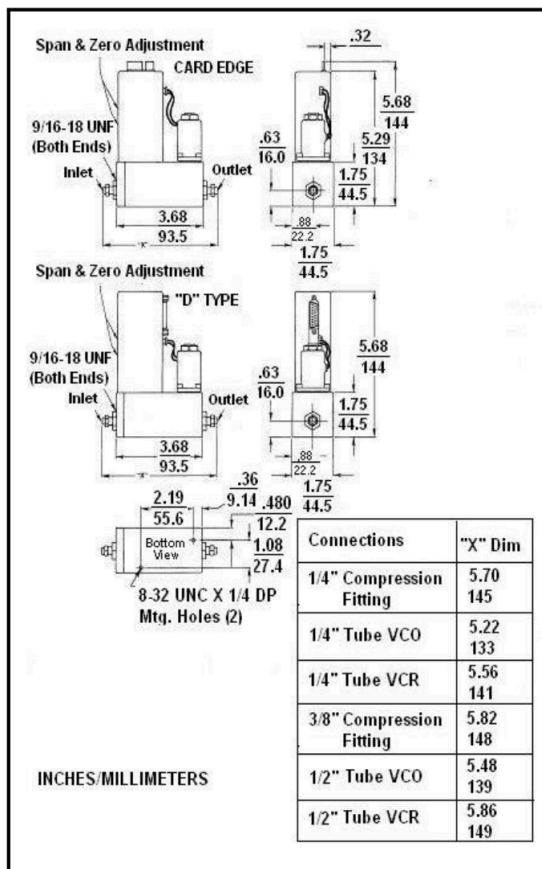
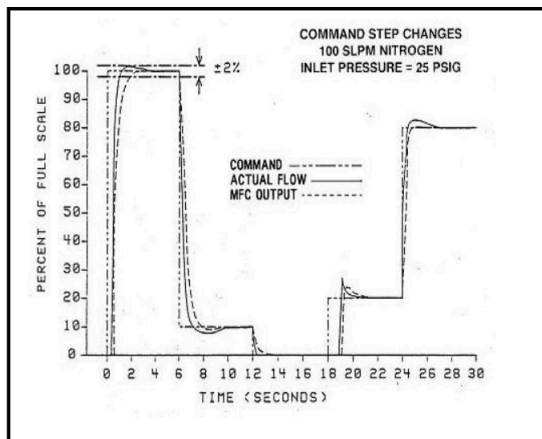


Figure 2. Dimensions



Model 5850E Performance Curve 1 slpm N₂ @ 25 psig

Specifications subject to change without any notice.