

# HIGH ACCURACY MASS FLOW CONTROLLERS

## For Clean, Non-Coating Gases

FMA-7000E Series  
Starts at

# \$1730



- ✓ ±1% Full Scale Accuracy
- ✓ ±0.25% of Rate Repeatability
- ✓ Broad Range in a Single Unit to Fit Most Applications
- ✓ Field Selectable Soft Start Eliminates Spoiled Batches
- ✓ Normally Closed Valve
- ✓ Low Pressure Drop
- ✓ Compact Design
- ✓ For Clean, Non-Coating Gases

**Compatible Meters:**  
DPF50, DPF60, DPF300,  
DP24-E, DPF403 (Section M)

FMA-7100E,  
\$2120, shown  
smaller than  
actual size.



Mating connector included.

OMEGA® FMA-7000E Mass Flow Controllers accurately measure gases on the basis of mass flow. The flow sensor produces an electrical output signal linear with the 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. This is accomplished automatically

by an electromagnetically actuated flow rate control valve.

### OPERATING PRINCIPLE

The operating principle of the controller is thermodynamic. A precision power supply directs heat to the midpoint of the sensor tube carrying 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, and carries it towards the downstream element. An increasing temperature difference develops between the two elements and this difference is proportional to the mass flow rate of the gas. A bridge circuit interprets the temperature difference and an amplifier provides the output to the control circuitry as well as a 0 to 5 Vdc output signal.

### CUSTOM BUILT TO ORDER!

To Order (Specify Model Number)						
Model No. ¼" Compression Fitting	Price	Model No. ¼" VCO	Price	Model No. ¼" VCR	Price	Max Range
FMA-7100E-(* )	\$2120	FMA-7200E-(* )	\$2180	FMA-7300E-(* )	\$2120	to 10 SCCM
FMA-7101E-(* )	1730	FMA-7201E-(* )	1790	FMA-7301E-(* )	1730	to 20 SCCM
FMA-7102E-(* )	1730	FMA-7202E-(* )	1790	FMA-7302E-(* )	1730	to 50 SCCM
FMA-7103E-(* )	1730	FMA-7203E-(* )	1790	FMA-7303E-(* )	1730	to 100 SCCM
FMA-7104E-(* )	1730	FMA-7204E-(* )	1790	FMA-7304E-(* )	1730	to 200 SCCM
FMA-7105E-(* )	1730	FMA-7205E-(* )	1790	FMA-7305E-(* )	1730	to 500 SCCM
FMA-7106E-(* )	1730	FMA-7206E-(* )	1790	FMA-7306E-(* )	1730	to 1 SLM
FMA-7107E-(* )	1730	FMA-7207E-(* )	1790	FMA-7307E-(* )	1730	to 2 SLM
FMA-7108E-(* )	1730	FMA-7208E-(* )	1790	FMA-7308E-(* )	1730	to 5 SLM
FMA-7109E-(* )	1730	FMA-7209E-(* )	1790	FMA-7309E-(* )	1730	to 10 SLM
FMA-7110E-(* )	1730	FMA-7210E-(* )	1790	FMA-7310E-(* )	1730	to 20 SLM

### SPECIFICATIONS

**Accuracy:** ±1% FS including linearity at calibration conditions, ±1.5% FS including linearity for flow ranges greater than 20 SLM  
**Repeatability:** ±0.25% of rate  
**Response Time:** <3 second response to within 2% FS final value with a 0 to 100% command step  
**Set Point Input:** 0 to 5 Vdc or 1000Ω potentiometer  
**Output:** 0 to 5 Vdc into 2000Ω minimum load; 3 mV rms max. ripple

Comes with complete operator's manual.  
 \* Please specify gas, temperature, and inlet and outlet pressure when ordering.  
 Ordering Examples: FMA-7100E-(Argon, 70°F, 150/100 psig), \$2120.  
 FMA-7102E-02, 70°C, 20/0psig, oxygen mass flow meter, \$1730.

# Complete the System



After Choosing Your Flowmeter, Select the System to Meet Your Requirements

### SYSTEM 1

**A Single Electronics Package Which Includes:**  
**Power Supply, Setpoint Control, Display, and Blending Control.**  
  
**Units for 2 or 4 Flowmeters, See page D-29.**

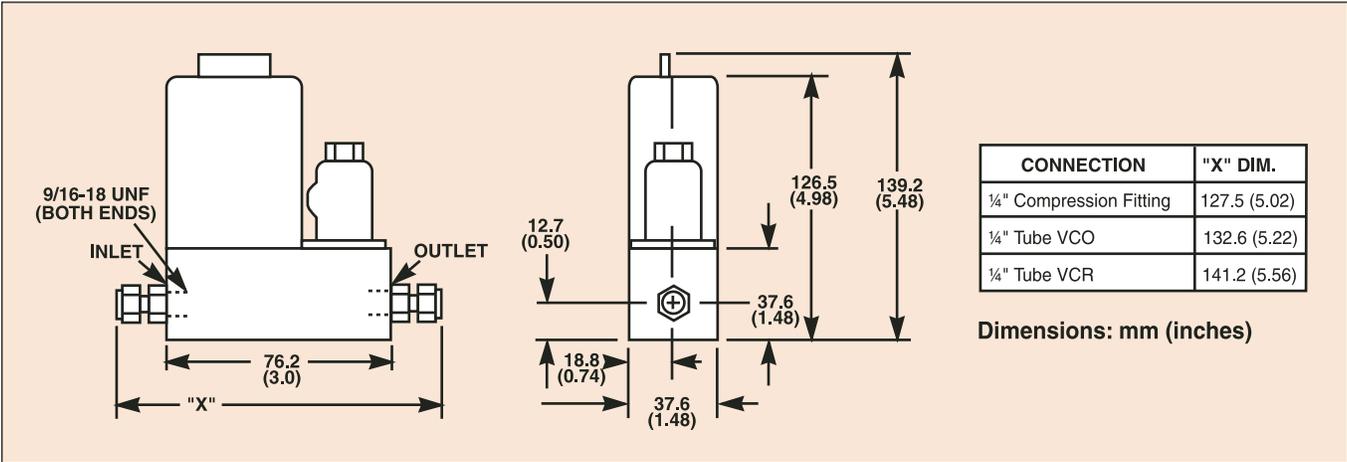
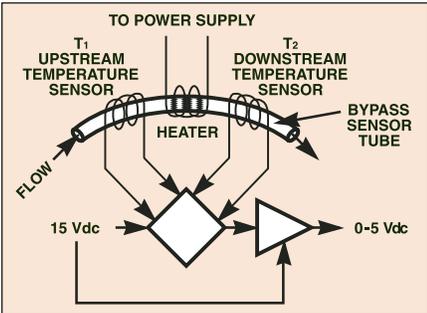
### SYSTEM 2

- Display and Alarm DPF64, \$289, See Page M-19.**
- Setpoint Potentiometer (1000Ω)**
- Computer Interface**  
**FC-21 \$764, Basic Unit**  
**FC-22 \$1076, Basic Unit**  
**See Page M-25.**
- Power Supply FPW-15, \$75. See page D-51.**

In addition to your mass flowmeter, select a complete flow measurement system to meet your requirements. System 1 is a single electronics package, as shown. System 2 is comprised of individual components for maximum flexibility.

**Maximum Pressure:** 1500 psig, pressure drop 5 to 50 psid  
**Temperature Range:** 4 to 66°C (40 to 150°F) ambient and gas  
**Temp. Sensitivity:**  
**Zero:** <math>\pm 0.075\%</math> FS per °C  
**Span:** <math>\pm 1.0\%</math> FS shift over 10 to 50°C (50 to 122°F) range  
**Power Supply Sensitivity:**  $\pm 0.09\%$  FS per % power supply voltage variation  
**Mounting Attitude Sensitivity:**  $\pm 0.5\%$  maximum FS deviation after zeroing  
**Leak Integrity:**  $1 \times 10^{-9}$  Atm. scc/sec helium  
**Control Range:** 50 to 1  
**Pressure Sensitivity:**  $\pm 0.03\%$  per psi up to 200 psig (N<sub>2</sub>)  
**Power:** +15 Vdc at 35 mA DC, -15 Vdc at 180 mA dc, 3.5 watts power consumption  
**Wetted Parts:** 316 and 430SS, FKM; PTFE optional

**Connections:** 1/4" stainless steel compression fittings; 1/4" VCO or 1/4" VCR optional  
**Electrical Connections:** Card edge, 20 terminals, gold over low stress nickel-plated copper  
**Accessories Included:** Mating connector with 1.5 m (5') ribbon cable model. Easy connector/cable assemblies available  
**Model FMA-7EC-(\*):**  
 1.5 m (5') = \$109  
 3.0 m (10') = \$120  
 7.6 m (25') = \$131  
 15.2 m (50') = \$141  
 \* Specify length: 5, 10, 25 or 50' sections



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