

MASS AND VOLUMETRIC GAS FLOW CONTROLLERS

For Clean Gases

FMA-2613A, \$2850, shown smaller than actual size.



FMA-2600A Series Starts at

\$1470

FMA-2601A, \$2190, shown smaller than actual size.



- ✓ 20+ Gas Calibrations, Including He, O₂, Neon, N₂O, N₂, Air, Argon, CO, CO₂, Methane, Ethane, H₂, Propane, Butane, iso-Butane, Ethylene, Acetylene, Krypton, Xenon, Sulfur Hexafluoride
- ✓ Pressure, Temperature, and Volumetric and Mass Flow Simultaneously Displayed
- ✓ Easy-to-Use Pushbutton Interface
- ✓ NIST Traceability Standard
- ✓ Full Scale Ranges from 0.5 SCCM to 1500 SLM
- ✓ Response Time of 50 to 100 ms Typical
- ✓ Turndown Ratio of 100:1 Typical
- ✓ Position Insensitive
- ✓ ±0.8% Reading Accuracy
- ✓ RS232 Standard

The FMA-2600A Series mass and volumetric flow controllers use the principle of differential pressure within a laminar flow field to determine and control mass flow rate. A laminar flow element (LFE) inside the meter forces the gas into laminar (streamlined) flow. Inside this region, the Poiseuille equation dictates that the volumetric flow rate be linearly related to the pressure drop. A differential pressure sensor is used to measure the pressure drop along a fixed distance of the LFE. This, along with the viscosity of the gas, is used to accurately determine the volumetric flow rate. Separate absolute temperature and pressure sensors

are incorporated and correct the volumetric flow rate to a set of standard conditions. This standardized flow rate is commonly called the mass flow rate and is reported in units such as standard cubic feet per minute (SCFM) or standard liters per minute (SLM).

The controller uses a true proportional valve coupled to the flow body to control flow using the integral PID loop controller. Standard units include a 0 to 5 Vdc output (4 to 20 mA optional) and RS232 communications. The gas-select feature and the setpoints can be adjusted from the front keypad or via RS232 communications. Volumetric flow, mass flow, absolute pressure, and temperature can all be viewed or recorded through the RS232 connection. It is also possible to multi-drop up to 26 units on the same serial connection to a distance of 46 m (150').

SPECIFICATIONS

Accuracy: ±(0.8% of reading + 0.2%FS)

Repeatability: ±0.2% FS

Turndown Ratio: 100:1

Control Response Time: 100 ms

Input Control Signal: 0 to 5 Vdc, RS232

Output Signal: 0 to 5 Vdc, RS232

Optional Input/Outputs: 4 to 20 mA, 0 to 10 Vdc

Operating Temperature: -10 to 50°C (14 to 122°F)

Zero Shift: 0.02%/ATM FS/°C

Span Shift: 0.02%/ATM FS/°C

Humidity Range: 0 to 100% RH, non-condensing

Excess Flow Rate: 2.4% FS

Wetted Materials: 303 and 302 SS, FKM, silicone RTV (rubber), glass-reinforced nylon, aluminum, brass, 410 SS, silicone, glass; >250 SLM: 416 SS and nickel replace brass

Maximum Pressure:

Mass Flow Controllers: 145 psig

To Use in Volumetric Mode: Near atmosphere, 15 psig recommended maximum. Volumetric flowmeters and controllers not certified for accuracy at mass flow rates above the rated flow range of the meter. They are designed for near atmospheric pressure conditions only. The recommended maximum operating pressure is 15 psig

Minimum Differential Pressure Required:
 5 SLM and under: 5 psid; 10 to 250 SLM:
 15 psid; 500 SLM: 5 psid; 1500 SLM: 10 psid
Supply Current: 0.250 A for 20 SLM and
 under; 0.75 A for 50 SLM and above (typical)
Supply Voltage: 12 to 30 Vdc for units
 20 SLM and smaller; 24 to 30 Vdc for units
 50 SLM and larger
Electrical Connections: 8-pin circular
 mini DIN

Dimensions: mm (in)

Flow Range	Height	Length	Depth
0.5 to 50 SCCM	100 (3.9)	89 (3.5)	26.7 (1.05)
100 SCCM to 20 SLM	104.1 (4.1)	92 (3.6)	26.7 (1.05)
50 to 100 SLM	120 (4.7)	185 (7.3)	58 (2.25)
250 SLM	140 (5.5)	188 (7.4)	58 (2.25)
500 to 1500 SLM	140 (5.5)	188 (7.4)	58 (2.25)

Please allow approximately 44.5 mm (1.75") on top of the unit for electrical cable connection.

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)

Mass Flowmeter Model No.	Price	4 to 20 mA Output Model No.	Price	Two 4 to 20 mA Output Model No.	Price	Two 0 to 5V Output Model No.	Price	Connection	Max Flow
FMA-2601A	\$2190	FMA-2601A-I	\$2250	FMA-2601A-I2	\$2310	FMA-2601A-V2	\$2250	10-32 thread	0.5 SCCM
FMA-2602A	2190	FMA-2602A-I	2250	FMA-2602A-I2	2310	FMA-2602A-V2	2250	10-32 thread	1 SCCM
FMA-2614A	1950	FMA-2614A-I	2010	FMA-2614A-I2	2070	FMA-2614A-V2	2010	10-32 thread	2 SCCM
FMA-2615A	1950	FMA-2615A-I	2010	FMA-2615A-I2	2070	FMA-2615A-V2	2010	10-32 thread	5 SCCM
FMA-2603A	1710	FMA-2603A-I	1770	FMA-2603A-I2	1770	FMA-2603A-V2	1770	10-32 thread	10 SCCM
FMA-2616A	1710	FMA-2616A-I	1770	FMA-2616A-I2	1830	FMA-2616A-V2	1770	10-32 thread	20 SCCM
FMA-2604A	1710	FMA-2604A-I	1770	FMA-2604A-I2	1830	FMA-2604A-V2	1770	10-32 thread	50 SCCM
FMA-2617A	1470	FMA-2617A-I	1530	FMA-2617A-I2	1590	FMA-2617A-V2	1530	1/8 FNPT	100 SCCM
FMA-2618A	1470	FMA-2618A-I	1530	FMA-2618A-I2	1590	FMA-2618A-V2	1530	1/8 FNPT	200 SCCM
FMA-2619A	1470	FMA-2619A-I	1530	FMA-2619A-I2	1590	FMA-2619A-V2	1530	1/8 FNPT	500 SCCM
FMA-2620A	1470	FMA-2620A-I	1530	FMA-2620A-I2	1590	FMA-2620A-V2	1530	1/8 FNPT	1 SLM
FMA-2605A	1470	FMA-2605A-I	1530	FMA-2605A-I2	1590	FMA-2605A-V2	1530	1/8 FNPT	2 SLM
FMA-2606A	1470	FMA-2606A-I	1530	FMA-2606A-I2	1590	FMA-2606A-V2	1530	1/8 FNPT	5 SLM
FMA-2607A	1470	FMA-2607A-I	1530	FMA-2607A-I2	1590	FMA-2607A-V2	1530	1/8 FNPT	10 SLM
FMA-2608A	1710	FMA-2608A-I	1770	FMA-2608A-I2	1830	FMA-2608A-V2	1770	1/8 FNPT	20 SLM
FMA-2609A	1830	FMA-2609A-I	1890	FMA-2609A-I2	1950	FMA-2609A-V2	1890	1/4 FNPT	50 SLM
FMA-2610A	2070	FMA-2610A-I	2130	FMA-2610A-I2	2190	FMA-2610A-V2	2130	1/4 FNPT	100 SLM
FMA-2611A	2430	FMA-2611A-I	2490	FMA-2611A-I2	2550	FMA-2611A-V2	2490	1/2 FNPT	250 SLM
FMA-2612A	2490	FMA-2612A-I	2550	FMA-2612A-I2	2610	FMA-2612A-V2	2550	3/4 FNPT	500 SLM
FMA-2613A	2850	FMA-2613A-I	2910	FMA-2613A-I2	2970	FMA-2613A-V2	2910	3/4 FNPT	1000 SLM
FMA-2621A	3342	FMA-2621A-I	3402	FMA-2621A-I2	3450	FMA-2621A-V2	3402	3/4 FNPT	1500 SLM

Accessories for FMA-2600A Series

Model No.	Price	Description
FMA1600-C1	\$35	Replacement 8-pin male mini DIN connector cable, single ended, 1.83 m (6')
FMA1600-C1-25FT	70	8-pin male mini DIN connector cable, single ended, 7.62 m (25')
FMA1600-C2	42	8-pin male mini DIN connector cable, double ended, 1.83 m (6')
FMA1600-C2-25FT	91	8-pin male mini DIN connector cable, double ended, 7.62 m (25')
FMA1600-C3	42	8-pin male mini DIN to DB9 female adaptor, 1.83 m (6')
FMA1600-CRA	49	8-pin male right-angle mini DIN cable, single ended, 7.83 m (6')
FMA1600-MDB	224	Multi-drop box
FMA1600-PSU	80	Universal 100 to 240 Vac to 24 Vdc power supply adaptor

Comes complete with 24 Vdc universal power supply, 1.8 m (6') cable, 8-pin male mini DIN connector, operator's manual, and NIST certificate. Standard units are calibrated to air @ 5 psig for 0 to 1 LPM, 15 psig for 2 to 10 LPM, 30 psig for 20 to 100 LPM, and 50 psig for 200 LPM and greater. For custom calibrations, add "-(*)" to the model number, no additional charge. *Specify gas, and inlet/outlet or backpressure for custom calibrations. Calibrations done at ambient temperature only, 21°C (70°F).

To replace the standard RS232 communications with RS485, add suffix "-RS485" to the model number, add \$120 to the price.

Standard input is 0 to 5V, for optional 4 to 20 mA input add suffix "-IN" to the model number, no additional cost. Standard output is scaled to the mass flow rate. For volumetric flow rate as standard output add suffix "-VOL" to the model number, no additional charge. For "-VOL" controllers the control loop is set to volumetric as standard.

** Optional secondary output are scaled the same as the primary output scale. For an alternate output scale add suffix "-T" to the model number for temperature or "-P" for pressure, no additional charge.

For an integrated positive shut-off valve, add suffix "-S" to the model number, and \$480 to the price. Models with the positive shut off valve have 1/4" welded male VCR fittings. Available on models up to 20 SLM.

For units scaled in SCFH, add suffix "-SCFH" to model number, no additional charge. For totalizer option, add suffix "-TOT" to the model number, and \$120 to the price. Please specify resolution.

This is a 6-digit counter. Examples: for totalizing in liters with 1/100 liter resolution, the max count would be 9999.99. For totalizing in liters with 1 liter resolution, the max count would be 999999.

Ordering Examples: FMA-2617A-V2T, 1/8 FNPT mass gas flow controller with optional second channel output of 0 to 5V for temperature, \$1530. FMA-2620A, 1/8 FNPT mass flow controller, \$1470.



UNITED STATES

www.omega.com
1-800-TC-OMEGA
Stamford, CT.

CANADA

www.omega.ca
Laval(Quebec)
1-800-TC-OMEGA

GERMANY

www.omega.de
Deckenpfronn, Germany
0800-8266342

UNITED KINGDOM

www.omega.co.uk
Manchester, England
0800-488-488

FRANCE

www.omega.fr
Guyancourt, France
088-466-342

CZECH REPUBLIC

www.omegaeng.cz
Karviná, Czech Republic
596-311-899

BENELUX

www.omega.nl
Amstelveen, NL
0800-099-33-44



More than 100,000 Products Available!

• Temperature

Calibrators, Connectors, General Test and Measurement Instruments, Glass Bulb Thermometers, Handheld Instruments for Temperature Measurement, Ice Point References, Indicating Labels, Crayons, Cements and Lacquers, Infrared Temperature Measurement Instruments, Recorders Relative Humidity Measurement Instruments, RTD Probes, Elements and Assemblies, Temperature & Process Meters, Timers and Counters, Temperature and Process Controllers and Power Switching Devices, Thermistor Elements, Probes and Assemblies, Thermocouples Thermowells and Head and Well Assemblies, Transmitters, Wire

• Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

• pH and Conductivity

Conductivity Instrumentation, Dissolved Oxygen Instrumentation, Environmental Instrumentation, pH Electrodes and Instruments, Water and Soil Analysis Instrumentation

• Data Acquisition

Auto-Dialers and Alarm Monitoring Systems, Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485 and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

• Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

• Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters