

MASS AND VOLUMETRIC GAS FLOW CONTROLLERS

For Clean Gases

FMA/FVL-2600A Series
Starts at

\$1470



- ✓ 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 (FMA-2600A Series)
- ✓ 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 and FVL-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.

Quick Selection Guide

- Operating pressures over 15 psig or with more than a little backpressure, use FMA-2600A Series
- Line temperature or pressure changes, use FMA-2600A Series
- If only basic, digital, and uncompensated volumetric flow is required, use the more economical FVL-2600A Series
- For comparing or running flowmeters or controllers in line, use FMA-2600A Series



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

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

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 V 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').

The FVL-2600A Series comprises volumetric flow controllers only. They do not measure or correct for absolute pressure or temperature. The FMA-2600A Series is recommended if operating pressure is above 15 psig or if there is any restriction or backpressure in the application.

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

Volumetric Flow Controllers:

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

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)	190 (7.5)	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.

Supply Current: 0.250 A for 20 SLM and under; 0.75 A for 50 SLM and above (typical)

Electrical Connections: 8-pin circular mini DIN

Supply Voltage: 12 to 30 Vdc for units 20 SLM and smaller; 24 to 30 Vdc for units 50 SLM and larger

MOST POPULAR MODELS HIGHLIGHTED!

To Order (Specify Model Number)

Model No. Gas Mass Flow Controller	Price	Model No. Volumetric Gas Flow Controller	Price	Connection	Max Flow Rate
FMA-2601A	\$2190	FVL-2601A	\$2190	10-32 thread	0.5 SCCM
FMA-2602A	2190	FVL-2602A	2190	10-32 thread	1 SCCM
FMA-2614A	1950	FVL-2614A	1950	10-32 thread	2 SCCM
FMA-2615A	1950	FVL-2615A	1950	10-32 thread	5 SCCM
FMA-2603A	1710	FVL-2603A	1710	10-32 thread	10 SCCM
FMA-2616A	1710	FVL-2616A	1710	10-32 thread	20 SCCM
FMA-2604A	1710	FVL-2604A	1710	10-32 thread	50 SCCM
FMA-2617A	1470	FVL-2617A	1470	1/8 FNPT	100 SCCM
FMA-2618A	1470	FVL-2618A	1470	1/8 FNPT	200 SCCM
FMA-2619A	1470	FVL-2619A	1470	1/8 FNPT	500 SCCM
FMA-2620A	1470	FVL-2620A	1470	1/8 FNPT	1 SLM
FMA-2605A	1470	FVL-2605A	1470	1/8 FNPT	2 SLM
FMA-2606A	1470	FVL-2606A	1470	1/8 FNPT	5 SLM
FMA-2607A	1470	FVL-2607A	1470	1/8 FNPT	10 SLM
FMA-2608A	1710	FVL-2608A	1710	1/8 FNPT	20 SLM
FMA-2609A	1830	FVL-2609A	1830	1/4 FNPT	50 SLM
FMA-2610A	2070	FVL-2610A	2070	1/4 FNPT	100 SLM
FMA-2611A	2430	FVL-2611A	2430	1/2 FNPT	250 SLM
FMA-2612A	2490	FVL-2612A	2490	3/4 FNPT	500 SLM
FMA-2613A	2850	FVL-2613A	2850	3/4 FNPT	1000 SLM
FMA-2621A	3342	FVL-2621A	3342	3/4 FNPT	1500 SLM

Accessories for FMA/FVL-2600A Series

Model No.	Price	Description
FMA1600-C1	\$35	Replacement single-ended 1.83 m (6') 8-pin mini DIN cable connector
FMA1600-C3	42	1.83 m (6') adaptor cable with male 8-pin DIN to male DB9
FMA1600-PSU	80	Replacement 24 Vdc universal power supply
FMA1600-E1	84	220 Vac to 12 Vdc power supply for 20 LPM or less
FMA1600-E2	146	220 Vac to 24 Vdc power supply for 50 LPM or greater
FW-337	92	Reference Book: Industrial Flow Measurement

Comes complete with NIST certificate, 24 Vdc universal power supply, 1.83 m (6') cable 8-pin mini din connector and operator's manual.

Add **(*)**: Please specify gas, inlet/outlet or backpressure, and temperature for custom calibrations.

For 4 to 20 mA output, add suffix **"-I"** to model number and **\$60** to price.

For second channel output of 4 to 20 mA, add suffix **"-I2"** to model number and **\$60** to price.

For second channel output of 0 to 5V, add suffix **"-V2"** to model number and **\$60** to price.

Standard **"-I2"** and **"-V2"** options are scaled to the flow rate. For a different secondary output scale, add suffix **"-T"** for temperature and suffix **"-P"** for pressure, no additional charge.

For 4 to 20 mA input, add suffix **"-IN"** to model number, no additional charge.

For totalizer option, add suffix **"-TOT"** to model number and **\$120** to price.

Please specify resolution. This is a 6-digit counter. Examples: For totalizing in liters with 1/100 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-I2T, 1/8 FNPT mass gas flow controller with optional second channel output of 4 to 20 mA for temperature, \$1470 + 60 = **\$1530**.

FMA-2620A, 1/8 FNPT mass flow controller, **\$1470**.





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• 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

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• 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