

ECONOMICAL GAS MASS FLOW CONTROLLERS AND METERS

For Clean Gases

FMA3100 Series



Optional

- ✓ For Flow Rates Up to 10 SLM
- ✓ 0 to 5 Vdc Linear Output
- ✓ Cost Effective

FMA3100 Series mass flow sensors represent a breakthrough in mass flow sensor technology. State-of-the-art electronics, a compact mechanical design, and mass production tooling concepts are combined into one high-performance, cost effective product. The gas flow sensor is suitable for many OEM applications. A 0 to 5 Vdc linear output is standard.

Using the basic FMA3100 thermal mass flow sensor, the FMA3200 mass flow controllers offer accurate, stable control of gas flows in a compact package. In power-off mode, the flow control valve is closed with a minimal leak rate. This cost-effective controller is ideal for many OEM applications, with a 0 to 5 Vdc linear output and a 0 to 5 Vdc control input.

The FMA3300s combine the features of the FMA3100 with an adjustable 3½ digit LCD digital display meter for viewing flow rate in engineering units (i.e., mL/min or L/min). These compact flowmeters have proved effective in many laboratory applications.

GENERAL SPECIFICATIONS

Output: 0 to 5 Vdc (2500 Ω minimum)

Input Setpoint Voltage

(FMA3200 Only): 0 to 5 Vdc

Accuracy: $\pm 1.5\%$ FS*

Repeatability: $\pm 0.5\%$ FS

Response Time: 2 seconds (typical) to within $\pm 2\%$ of actual flow rate from 25 to 100% of full scale



FMA3206 mass flow controller, shown actual size.

Operating Ambient:

10 to 50°C (50 to 122°F), non-condensing atmosphere

Operating Pressure Range:

To 150 psi maximum at 25°C (77°F)

Temperature Coefficient:

$\pm 0.2\%$ per °C

Pressure Coefficient: $\pm 0.02\%$ per psi

Leak Integrity: 1×10^{-4} SCCS

He maximum to outside environments

Input Power:

FMA3100 and FMA3300:

12 to 15 Vdc, 100 mA (1.5 W)

FMA3200: 12 to 15 Vdc,

250 mA (3.75 W)

Connections: 1/8" compression fittings, flow ranges up to 1 L/min;

1/4" compression fitting for up to 5 L/min;

3/8" compression fitting for 10 L/min

Wetted Materials:

Anodized aluminum, FKM O-rings,

304 and 316 SS, epoxy, acetal

compression tube fittings standard

Turndown Ratio: 10:1

Gases: Most clean, dry gases (e.g., air, nitrogen, carbon dioxide, argon, hydrogen, helium, methane, oxygen)

Filtration: Requires 20-micron filter if gas contains any particulate matter

SPECIFICATIONS

(FMA3200 Flow Controllers)

Differential Pressure: 15 to 40 psi

Valve Cycle Life: >1 million cycles; valve is normally closed

Control Range: 50:1

Remote Setpoint Voltage: 0 to 5 Vdc

Weight:

FMA3100: 199 g (0.44 lb)

FMA3300: 249 g (0.55 lb)

FMA3200: 386 g (0.85 lb)

Size Without Fittings (Approx.):

FMA3100: 47 L x 26 W x 90 mm H (1.87 x 1.03 x 3.55")

FMA3300: 47 L x 26 W x 127 mm H (1.87 x 1.03 x 5.0")

FMA3200: 81 L x 26 W x 97 mm H (3.17 x 1.03 x 3.80")

* Stated accuracy under general specifications valid for the following conditions:

1. Temperature between 18 and 25°C (64 and 77°F)
2. Warm-up time: at least 10 min
3. Power input voltage stable (12V ± 0.1 V) typical
4. Linearity: Add $\pm 0.5\%$ for ranges up to 500 SCCM, $\pm 1.0\%$ over 500 SCCM
5. Accuracy range: 10 to 100%
6. Line pressure of 1 to 30 psi for FMA3100 and FMA3300, and at factory-specified settings for FMA3200
7. Factory gas (specified) is used

To Order			
Flow Meters			
Model No. Without Display	Model No. P With Display	Flow Rates**	Pressure Drop at Max Flow
FMA3101	FMA3301	0 to 20 SCCM	1" H ₂ O
FMA3102	FMA3302	0 to 50 SCCM	
FMA3103	FMA3303	0 to 100 SCCM	2" H ₂ O
FMA3104	FMA3304	0 to 200 SCCM	
FMA3105	FMA3305	0 to 500 SCCM	
FMA3106	FMA3306	0 to 1 SLM	3" H ₂ O
FMA3107	FMA3307	0 to 2 SLM	
FMA3108	FMA3308	0 to 5 SLM	
FMA3109	FMA3309	0 to 10 SLM	10" H ₂ O

Comes complete with operator's manual, and 0.6 m (24") signal/power cable (compatible only with power supplies below).

For optional 4-point NIST calibration certificate add suffix "**-NISTAIR**" to model number for additional cost.

Ordering Example: FMA3307, 0 to 2000 SCCM flow meter with display, and FMA3115PW, power supply/output cable.

* Specify gas, inlet/outlet pressure and temperature.

** Flow ranges are based on dry air or nitrogen as a standard; other gases available (carbon dioxide, helium, argon, hydrogen, methane, oxygen) for an additional cost.

For optional 4-point NIST calibration certificate add suffix "**-NISTAIR**" to model number, for additional cost.

Ordering Example: FMA3203-(Helium, 20/0 psig, 70°F), 0 to 100 SCCM flow controller, and FMA3215PW, power supply/output cable.

Made to Order

Controller (Without a Display)		
Model No.	Flow Rates** P	Pressure Drop at Max Flow
FMA3202-(*)	0 to 50 SCCM	15 psi
FMA3203-(*)	0 to 100 SCCM	
FMA3204-(*)	0 to 500 SCCM	
FMA3205-(*)	0 to 5 SLM	
FMA3206-(*)	0 to 10 SLM	

Accessories

Flow Meters: FMA3100 and FMA3300 Series	
Model No.	Description
FMA3115PW	Power supply/output cable (0 to 5 Vdc), 115 Vac
FMA3230PW	Power supply/output cable (0 to 5 Vdc), 230 Vac
Controllers Only: FMA3200 Series	
FMA3215PW	Power supply/input/output cable (0 to 5 Vdc), 115 Vac
FMA3223PW	Power supply/input/output cable (0 to 5 Vdc), 230 Vac
Cable for FMA3100/3200/3300 Series	
FMA3000C	1 m (3') cable with mating connector and stripped ends for use with power supplies that have terminal connections