

# 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:** ±1.5% FS\*

**Repeatability:** ±0.5% FS

**Response Time:** 2 seconds (typical) to within ±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:

±0.2% per °C

#### Pressure Coefficient:

±0.02% per psi

#### Leak Integrity:

1x10<sup>-4</sup> 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 ±0.1V) typical
4. Linearity: Add ±0.5% for ranges up to 500 SCCM, ±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

FMA3303  
flow sensor



FMA3101  
flow sensor



Models shown  
smaller than  
actual size.

## 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 <sub>2</sub> O
FMA3102	FMA3302	0 to 50 SCCM	
FMA3103	FMA3303	0 to 100 SCCM	
FMA3104	FMA3304	0 to 200 SCCM	2" H <sub>2</sub> O
FMA3105	FMA3305	0 to 500 SCCM	
FMA3106	FMA3306	0 to 1 SLM	3" H <sub>2</sub> O
FMA3107	FMA3307	0 to 2 SLM	
FMA3108	FMA3308	0 to 5 SLM	
FMA3109	FMA3309	0 to 10 SLM	10" H <sub>2</sub> 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
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