



# PROGRAMMABLE GAS MASS FLOWMETERS AND TOTALIZERS

## For Clean Gases

FMA-4100/4300 Series  
Starts at



- ✓ 23 Selectable Engineering Units (Including User Defined)
- ✓ Programmable Totalizer
- ✓ High and Low Gas Flow Alarms
- ✓ Two Sets Programmable SPDT Relays with Latching Feature
- ✓ Selectable Analog 0 to 5 Vdc or 4 to 20 mA Outputs
- ✓ Internal Conversion Factors for Up to 32 Gases
- ✓ Digital Interface RS232 Standard
- ✓ Automatic Sensor Zero Offset Adjustment (Via Digital Interface or Local Push Button)
- ✓ Self-Diagnostic Tests
- ✓ Display Units Include Adjustable Back Lighting

The FMA-4100/4300 Series flow rate can be displayed in 23 different volumetric flow or mass flow engineering units including a user specific selection. Flowmeters can be programmed remotely via RS232 or RS485 (optional). FMA-4100/4300 flowmeters support various functions including, programmable flow totalizer, high and low flow alarm, automatic zero adjustment, 2 relay outputs, jumper selectable 0 to 5 Vdc or 4 to 20 mA analog outputs, status LED diagnostic, storage of up to 10 different gas calibrations, internal or user-specific K-factors. Display models have local 2 lines x 16 characters LCD display with adjustable back light provides flow,



FMA-4303, shown smaller than actual size.

total and diagnostic reading simultaneously. The digital RS232 or RS485 (optional) interface provides access to applicable internal data including, flow, CPU temperature, auto zero, totalizer and alarms settings, gas table, conversion factors and engineering units selection, dynamic response compensation and linearization table adjustment. The analog interface provides 0 to 5 Vdc or 4 to 20 mA (jumper selectable) outputs for flow reading.

The FMA-4100/4300 supports automatic sensor zero offset adjustment which can be activated locally via the maintenance push button or remotely via digital interface. The auto zero feature necessitates a condition of absolutely no flow through the meter during the adjustment process. Provisions are made to either start, read, or save the current auto zero value via digital commands. Digital totalizer commands include: set to zero, start

at a preset flow, assign action to a preset value, start/stop totalizing and read. High and Low gas flow alarm limits can also be preprogrammed via digital interface. Alarm action can be assigned with preset delay interval (0 to 3600 seconds) to activate the contact closer (separate for high and low alarm). Latch mode control feature allows each relay to be latched on or follow the corresponding alarm status.

### SPECIFICATIONS

**Calibrations:** Performed at standard conditions [101.4 kPa (14.7 psia) and 21.1°C (70°F)] unless otherwise requested or stated

**Environmental (PER IEC 664):** Installation Level II; Pollution Degree II  
**Flow Accuracy (Including Linearity):** ±1% of FS at calibration temperature and pressure

**Repeatability:** ±0.15% of full scale  
**Flow Temperature Coefficient:** 0.15% of full scale/°C or better

**Flow Pressure Coefficient:** 0.01% of full scale/psi (6.895 kPa) or better

**Turndown Ratio:** 50:1

**Flow Response Time:** 600 ms time constant; approximately 2 seconds to within  $\pm 2\%$  of set flow rate for 25 to 100% of full scale flow

**Max Gas Pressure:** 3447 kPa gauge (500 psig)

**Max Pressure Drop:** 1.28 kPa (0.18 psi)

**Gas and Ambient Temperature:** 5 to 50°C (41 to 122°F)

**Relative Gas Humidity:** Up to 70%

**Leak Integrity:** 1 x 10<sup>-9</sup> SCCS He max to the outside environment

**Attitude Sensitivity:** Deviation of up to 1% from stated accuracy, after re-zeroing

**Output Signals:** Linear 0 to 5 Vdc (3000  $\Omega$  min load impedance); Linear 4 to 20 mA (500  $\Omega$  max loop resistance). Max noise 20 mV peak to peak (for 0 to 5 Vdc output)

**Relay:** SPDT (30 Vdc, 1A)

**Transducer Input Power:**

11 to 26 Vdc, 100 mV max peak to peak output noise

**Power Consumption:** +12 Vdc (200 mA max); +24 Vdc (100 mA max); Circuit board has built-in polarity reversal protection, 300 mA resettable fuse provide power input protection

**Wetted Materials:**

**Aluminum Models:** Anodized aluminum, brass, 316 stainless steel, FKM O-rings

**Stainless Steel Models:**

316 stainless steel, FKM O-rings

**Optional O-ring Materials:**

Buna, EPR (Ethylene Propylene), or perfluoroelastomer

**Inlet and Outlet Connections:**

**Model FMA-4100/4300:** Standard 6.35 mm (1/4") compression fittings

**Optional:** 3.18 or 9.53 mm (1/8" or 3/16") compression fittings

**Display (FMA-4300 Models):** Local 2 lines x 16 characters LCD with adjustable backlight (2-lines of text)

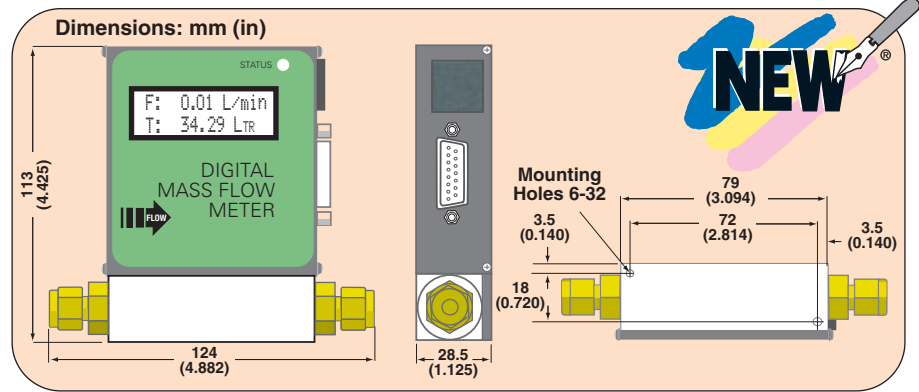
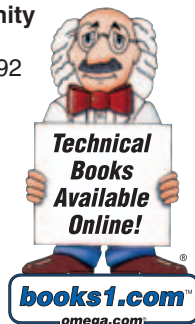
**Calibration Options:** Standard is one 10-points NIST traceable calibration. Optional, up to 9 additional calibrations may be ordered at additional charge. Contact OMEGA for additional information

**CE Compliance:** EMC compliance with 89/336/EEC as amended

**Emission Standard:** EN 55011:1991, Group 1

**Class A Immunity Standard:**

EN 55082-1:1992



**MOST POPULAR MODELS HIGHLIGHTED!**

### To Order (Specify Model Number)

| Model No. | Body     | Integral Display | Range         |
|-----------|----------|------------------|---------------|
| FMA-4102  | Aluminum | —                | 0 to 5 SCCM   |
| FMA-4103  | Aluminum | —                | 0 to 10 SCCM  |
| FMA-4104  | Aluminum | —                | 0 to 20 SCCM  |
| FMA-4105  | Aluminum | —                | 0 to 50 SCCM  |
| FMA-4106  | Aluminum | —                | 0 to 100 SCCM |
| FMA-4107  | Aluminum | —                | 0 to 200 SCCM |
| FMA-4108  | Aluminum | —                | 0 to 500 SCCM |
| FMA-4109  | Aluminum | —                | 0 to 1 SLM    |
| FMA-4110  | Aluminum | —                | 0 to 2 SLM    |
| FMA-4111  | Aluminum | —                | 0 to 5 SLM    |
| FMA-4112  | Aluminum | —                | 0 to 10 SLM   |
| FMA-4302  | Aluminum | Y                | 0 to 5 SCCM   |
| FMA-4303  | Aluminum | Y                | 0 to 10 SCCM  |
| FMA-4304  | Aluminum | Y                | 0 to 20 SCCM  |
| FMA-4305  | Aluminum | Y                | 0 to 50 SCCM  |
| FMA-4306  | Aluminum | Y                | 0 to 100 SCCM |
| FMA-4307  | Aluminum | Y                | 0 to 200 SCCM |
| FMA-4308  | Aluminum | Y                | 0 to 500 SCCM |
| FMA-4309  | Aluminum | Y                | 0 to 1 SLM    |
| FMA-4310  | Aluminum | Y                | 0 to 2 SLM    |
| FMA-4311  | Aluminum | Y                | 0 to 5 SLM    |
| FMA-4312  | Aluminum | Y                | 0 to 10 SLM   |

### Accessories

| Model No.       | Description   |
|-----------------|---|
| FMA-4000PS-NA   | Power supply 110 Vac, N American plug                           |
| FMA-4000PS-EU   | Power supply 230 Vac, European plug                             |
| FMA-4000PS-UK   | Power supply 230 Vac, U.K. plug                                 |
| FMA-4000PS-AU   | Power supply 230 Vac, Australian plug                           |
| FMA-4000PS-NA-A | Power supply 110 Vac, N American plug with analog wires         |
| FMA-4000PS-EU-A | Power supply 230 Vac, European plug with analog wires           |
| FMA-4000PS-UK-A | Power supply 230 Vac, U.K. plug with analog wires               |
| FMA-4000PS-AU-A | Power supply 230 Vac, Australian plug with analog wires         |
| FMA-4000C       | 15-pin D pre-wired 1.8 m (6') to PC, 0.9 m (3') to power supply |
| ME-1851         | Reference Book: Fundamentals of Gas Dynamics                    |

Comes complete with software CD (operator's manual included on CD), 15-pin D pre-wired 1.8 m (6') cable, and NIST certificate. Power supply sold separately.

For models with stainless steel body add suffix "-ST" to model number

To replace the RS232 communications with RS485, add suffix "-RS485" to model number, no additional charge. For units with 1/8" compression fittings add suffix "-1/8" to model number, no additional charge. For units with 3/16" compression fittings add suffix "-3/16" to model number, no additional charge.

**Ordering Examples:** FMA-4308, aluminum flowmeter with display 0 to 500 SCCM and FMA-4000PS-NA, 110 Vac plug-in power supply,

FMA-4105, aluminum flowmeter without display 0 to 50 SCCM,

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