

MULTI-RANGE MULTI-GAS FLOWMETERS AND CONTROLLERS



FMA7400/7500



- ✓ In-Process Programming
- ✓ Programmable Full Scale
- ✓ 50:1 Turndown
- ✓ RS485 Standard
- ✓ 316 SS VCR Fitting Available
- ✓ Fast Response Time <1 Second
- ✓ Multiple Native Gas Calibration Reference
- ✓ Configurable

OMEGA® FMA7400/7500 (elastomer seal) and (-SS) (metal seal) thermal mass flow meters and controllers achieve unprecedented performance, reliability, and flexibility in many gas flow measurement and control applications. The FMA7400/7500 is designed to overcome a long-standing limitation of many thermal mass flow units when changing gas types, a simple correction factor, such as the ratio of heat capacities between the calibration gas and new gas, cannot account for accuracy-robbing viscosity and density differences.

The OMEGA FMA7400/7500 database is built on thousands of native gas runs to establish correction functions that account for both thermal and physical differences among gases making the FMA7400/7500 series among the most accurate and flexible mass flow designs available today. The FMA7400/7500 series is the perfect choice for customers who use thermal mass flowmeters or controllers on a variety of gases, who need to change gas type frequently, or who need to re-range while preserving gas measurement and control accuracy.

The OMEGA FMA7400/7500 series features a corrosion-resistant Hastelloy® C-22 sensor for durable, long-term operation.



FMA7400 shown smaller than actual size.

Settling time is less than a second and full scale accuracy is 1%, this ensures that the FMA7400/7500 will provide reliable flow measurement or flow control in demanding gas flow applications. Both FMA7400/7500 and the (-SS) version achieve excellent internal to external leak integrity for challenging process gases as found in CVD, solar, and other processes.

A major advancement over traditional single point gas conversion factors, OMEGA delivers up to a three times improvement in process gas accuracy. This is achieved through advanced gas modeling plus extensive actual gas testing protocols that provide extremely accurate compensation. This also allows the device to be quickly and easily configured for another gas and/or flow range without sacrificing accuracy or range-ability. Selecting a new gas automatically creates a new calibration curve, establishes optimized PID settings for dynamic control, compensates for gas density and viscosity effects, and ensures smooth, overshoot-free transitions between flow rates with excellent steady state stability supplying unparalleled flexibility. Re-programming is simple and fast; a new gas and range can be programmed in under 60 seconds.

SPECIFICATIONS

- Full Scale Flow Range:** 3 sccm to 50 slm (depending on model number)
- Flow Accuracy:** ±1% set-point 35 to 100%, ±0.35% full scale 2 to 35%, ±3% with selected gas feature
- Repeatability and Reproducibility:** < 0.2% S.P.
- Linearity:** ±0.5% full scale (included in accuracy)
- Response Time (Settling Time):** <1 second (within 2% for steps 0 to 10 through 0 to 100%)
- Control Range:** 2 to 100% (normally closed valve)
- Number of Bins:** 10 bins
- Valve Shut Down:** < 1% of full scale (normally closed valve)
- Zero Stability:** < ±0.5% full scale per year
- Pressure Coefficient:** 0.03% per psi (0 to 50 psi N₂)
- Attitude Sensitivity:** <0.25% span change @ 90° after re-zeroing (N₂ @ 50 psi)
- Auto Zero:** Optional
- Reference Temperature:** 0°C (standard), 15, 20 or 21.1°C (optional)
- Operating Temperature Range:** 5 to 50°C (41 to 122°F)
- Maximum Operating Pressure:** 150 psig (10 bar)
- Differential Pressure Range:** 3 to 860 sccm = 7 to 45 psid, 861 to 7200 sccm = 15 to 45 psid, 7201 to 50000 sccm = 25 to 45 psid
- Note:** High density gases require additional differential pressure. **Example:** Argon gas applications require an additional 10 psid differential pressure.



Leak Integrity (External): Elastomer seal 1x10⁻⁹ atm. cc/sec He, metal seal 1x10⁻¹⁰ atm. cc/sec He

Valve Type: Normally closed (controllers only), normally open with automatic shut-off (optional)

Fitting: ¼" compression (standard), ¼" VCR (standard for -SS models)

Downstream Conditions: Atmosphere (standard), vacuum or positive pressure (optional)

Primary Wetted Materials: 316 stainless steel, hastelloy C-22, 17-7 PH, 430 SS

External Seals: FKM (standard)
Optional: Buna, Perfluoroelastomer, EPDM or Neoprene, 316 SS (standard for -SS)

Internal Seals/Valve Seat: FKM (standard), PFA (standard for -SS)

Optional: Buna, Perfluoroelastomer, EPDM or Neoprene

Electrical

Diagnostic/Service Port: All variations have an RS485 diagnostic/service port via 2.5 mm jack

RS485/Analog (Standard)

Digital Communication Protocol: Proprietary protocol based on HART® command set

Electrical Connection: 1 x 15-pin male Sub-D, (A), AUX valve drive (RELAY)

Analog I/O: 0 to 5V (standard), 0 to 10V, 0 to 20 mA, or 4 to 20 mA (optional)

Power: 12 to 24 Vdc/normal operation 7 watt maximum purge 8 watt

Profibus (Optional)

Electrical Connection: 1 x 15-pin male sub-D/1 x 9-pin female sub-D

Analog I/O: 0 to 5V, 0 to 20 mA or 4 to 20 mA

Power: ±13.5 Vdc to ±27 Vdc/7 watt maximum, purge 8 watt

DeviceNet (optional)

Electrical Connection: 1 x M12 with threaded coupling nut (B)

Analog I/O: 0 to 5V

Power: ±11 Vdc to ±25 Vdc/7 watt maximum, purge 8 watt

Diagnostics and Display

Status Lights: Controller health, network status

Alarms: Sensor output, control valve output, over temperature, power surge/sag, network interruption

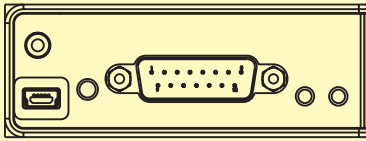
Compliance

Environmental: CE, RoHS

Electrical Interface

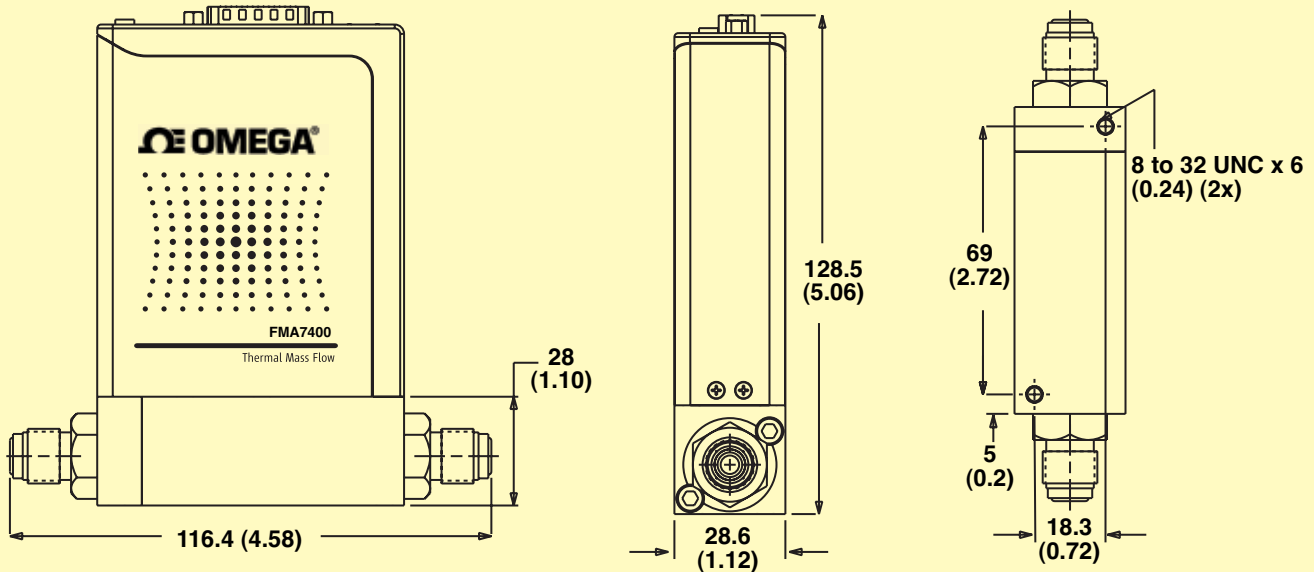
Base I/O Options

Analog/RS485



Pin No.	Signals
1	Setpoint Common
2	Flow output (0 to 5V standard, 0 to 10V optional)
3	Alarm out
4	Flow output (0 to 20 mA, 4 to 20 mA optional)
5	Power supply (12 to 24 Vdc)
6	NC
7	Setpoint input (0 to 20 mA, 4 to 20 mA optional)
8	Setpoint input (0 to 5V standard, 0 to 10V optional)
9	Power Common
10	Flow out common
11	NC
12	Valve override input
13	Aux Input (0 to 5V, 0 to 10V)
14	RS485B
15	RS485A

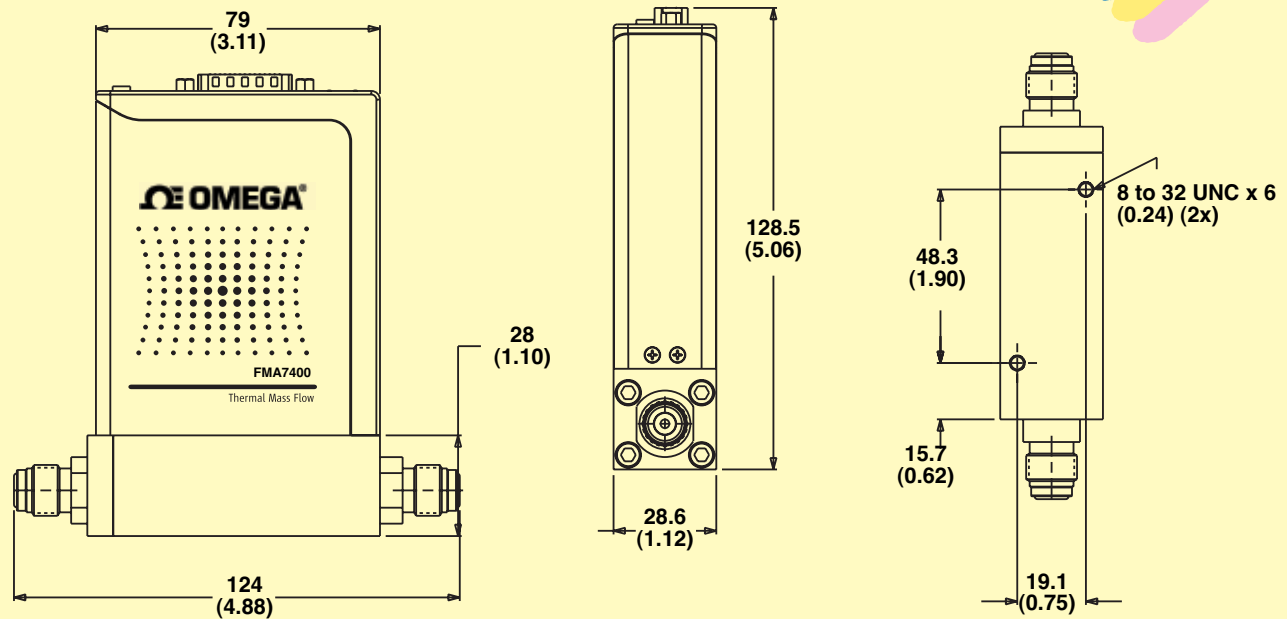
**Dimensions: mm (inch)
 Analog/RS485**



Dimensions (-SS):
mm (inch)



Analog/RS485



To Order Visit omega.com/fma7400_7500 for Pricing and Details

Model No.	Description	Minimum Range	Maximum Range
FMA-7502	Mass flowmeter	1 to 3 sccm	3 to 10 sccm
FMA-7503	Mass flowmeter	3 to 11 sccm	11 to 30 sccm
FMA-7504	Mass flowmeter	11 to 31 sccm	31 to 92 sccm
FMA-7505	Mass flowmeter	31 to 93 sccm	93 to 280 sccm
FMA-7506	Mass flowmeter	93 to 281 sccm	281 to 860 sccm
FMA-7507	Mass flowmeter	0.28 to 0.86 lpm	0.86 to 2.6 lpm
FMA-7508	Mass flowmeter	0.86 to 2.6 lpm	2.6 to 7.2 lpm
FMA-7509	Mass flowmeter	2.6 to 7.2 lpm	7.2 to 15 lpm
FMA-7510	Mass flowmeter	7.2 to 15 lpm	15 to 30 lpm
FMA-7511	Mass flowmeter	15 to 30 lpm	30 to 50 lpm
FMA-7402	Mass flow controller	1 to 3 sccm	3 to 10 sccm
FMA-7403	Mass flow controller	3 to 11 sccm	11 to 30 sccm
FMA-7404	Mass flow controller	11 to 31 sccm	31 to 92 sccm
FMA-7405	Mass flow controller	31 to 93 sccm	93 to 280 sccm
FMA-7406	Mass flow controller	93 to 281 sccm	281 to 860 sccm
FMA-7407	Mass flow controller	0.28 to 0.86 lpm	0.86 to 2.6 lpm
FMA-7408	Mass flow controller	0.86 to 2.6 lpm	2.6 to 7.2 lpm
FMA-7409	Mass flow controller	2.6 to 7.2 lpm	7.2 to 15 lpm
FMA-7410	Mass flow controller	7.2 to 15 lpm	15 to 30 lpm
FMA-7411	Mass flow controller	15 to 30 lpm	30 to 50 lpm

Units include 7 point NIST calibration and link to software.

Full scale ranges are for Nitrogen equivalent with a 0°C reference temperature. Selecting other gases or reference temperatures will result in different available ranges.

Standard: 1/4" compression fitting, atmosphere downstream, RS485, 0 to 5 V input/output and reference temperature 0°C.

For units with 1/4" stainless steel VCR fittings and PFA valve seats, add "-SS" to the model number for additional cost.

Accessories

Model No.	Description (One kit required per order)
FMA745-CK	Configuration Kit, downloadable software, programming cable and 232/485 converter
FMA745-CKP	Configuration Kit, downloadable software, cable, converter, power supply and power cord

Ordering Examples: FMA-7507, mass flowmeter, full scale programmable from 0.86 to 2.6 lpm.

FMA-7405, mass flow controller, full scale programmable from 93 to 280 sccm.