

M Series

Digital Mass Flow Measurement



alicat.com/m

Series Overview

Alicat Scientific M-Series digital mass flow meters accurately and rapidly measure the mass flow rate, volumetric flow rate, pressure and temperature of process gases.

At the heart of Alicat's M-Series mass flow meters is a patented, internally compensated, laminar differential pressure measurement technology that yields linear results over a very wide flow range. This produces volumetric and mass flow data that is fully compensated for changes in pressure and temperature and corrected for the user's STP. All mass flow meters come with NIST-traceable calibration sheets.

With no internal moving parts or heating elements, the M Series is electrically efficient and insensitive to bumps or changes in orientation. Alicat backs every mass flow instrument with generous customer support, including free technical phone support, prompt recalibration service and a lifetime warranty.

Alicat M-Series mass flow meters feature large integrated displays with touchpad-accessible gas selection from 30 user-selectable gas calibrations and both analog and RS-232 digital communications. Extensive product customizations are available, including Class 1, Div 2 ATEX/CSA ratings for use in hazardous environments. The M Series is available with corrosion-resistant wetted materials (MS Series), low pressure drop (MW Series) and battery operation (MB Series).



Applications

Alicat Scientific M-Series digital mass flow meters are used in a variety of industries, from scientific and analytical testing to manufacturing and metrology. Multi-variable measurement, multiple gas calibrations and a low 200:1 turndown ratio allow a single M-Series meter to replace several application-specific devices. Available 0.4% accuracy, 0.2% full-scale repeatability and <10 ms metering response times ensure optimal performance of gas flow processes.

The M Series is available in full-scale mass flow rates from 0-0.5 sccm to 0-4000 slpm.

Technical Data for Alicat **M-Series** Mass Flow Meters

0 – 0.5 sccm Full Scale through 0 – 3000 slpm Full Scale



Tel: 888-290-6060

www.alicat.com/m

Standard Specifications (Contact Alicat for available options.)

Performance	M-Series Mass Flow Meter
Accuracy at calibration conditions after tare	± (0.8% of Reading + 0.2% of Full Scale)
High Accuracy at calibration conditions after tare	± (0.4% of Reading + 0.2% of Full Scale) High Accuracy option not available for units ranged under 5 sccm or over 500 slpm.
Accuracy for Bidirectional Meters at calibration conditions after tare	± (0.8% of reading + 0.2% of total span from positive full scale to negative full scale)
Repeatability	± 0.2% Full Scale
Zero Shift and Span Shift	0.02% Full Scale / °Celsius / Atm
Operating Range / Turndown Ratio	0.5% to 100% Full Scale / 200:1 Turndown
Maximum Measurable Flow Rate	128% Full Scale
Typical Response Time	10 ms (Adjustable)
Warm-up Time	< 1 Second

Operating Conditions	M-Series Mass Flow Meter
Mass Reference Conditions (STP)	25°C & 14.696 psia (standard — others available on request)
Operating Temperature	-10 to +50 °Celsius
Humidity Range (Non-Condensing)	0 to 100%
Maximum Pressure	145 psig
Mounting Attitude Sensitivity	None
Ingress Protection	IP40
Wetted Materials	303 & 302 Stainless Steel, Viton®, Silicone RTV (Rubber), Glass Reinforced Nylon, Aluminum If your application demands a different material, please contact Alicat.

Communications / Power	M-Series Mass Flow Meter
Monochrome LCD or Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
Digital Output Signal ¹ Options	RS-232 Serial / RS-485 Serial / PROFIBUS ³
Analog Output Signal ² Options	0-5 Vdc / 1-5 Vdc / 0-10 Vdc / 4-20 mA
Optional Secondary Analog Output Signal ²	0-5 Vdc / 1-5 Vdc / 0-10 Vdc / 4-20 mA
Electrical Connection Options	8 Pin Mini-DIN / 9-pin D-sub (DB9) / 15-pin D-sub (DB15) / 6 pin locking
Supply Voltage	7 to 30 Vdc (15-30 Vdc for 4-20 mA outputs)
Supply Current	0.040 Amp (+ output current on 4-20 mA)

1. The **Digital Output Signal** communicates Mass Flow, Volumetric Flow, Pressure and Temperature
2. The **Analog Output Signal** and **Optional Secondary Analog Output Signal** communicate your choice of Mass Flow, Volumetric Flow, Pressure or Temperature
3. If selecting **PROFIBUS**, no analog signal is available. PROFIBUS units do not have the display. See PROFIBUS specifications for PROFIBUS supply voltages and currents. (www.alicat.com/profibus)

Features	M-Series Mass Flow Meter
30 Gas Select™ 30 On-Board User Selectable Gas Calibrations	<p>Programmed Gases: Acetylene, Air, Argon, Butane, Carbon Dioxide, Carbon Monoxide, Ethane, Ethylene (Ethene), Helium, Hydrogen, Iso-Butane, Krypton, Methane, Neon, Nitrogen, Nitrous Oxide, Oxygen, Propane, Sulfur Hexafluoride, Xenon, A-25, A-75, A1025, C-2, C-8, C-10, C-25, C-75, P-5, Star29</p> <p>If your application calls for a gas not on this list, please let us know. We can also calibrate to a wide variety of complex gas mixtures involving up to eight gas constituents.</p> <p>Alicat's MS-Series meters are also compatible with these aggressive gases: Ammonia, Chlorine Gas, Hydrogen Sulfide, Nitric Oxide, Nitrogen Trifluoride, Propylene, Sulfur Dioxide, Nitrogen Dioxide to 0.5% in an inert carrier, Refrigerant gases (www.alicat.com/ms)</p>

Range Specific Specifications

Full Scale Flow Mass Meter	Pressure Drop at FS Flow (psid) venting to atmosphere	Mechanical Dimensions	Process Connections ²
0.5 sccm to 1 sccm	1.0	3.9"H x 2.4"W x 1.1"D	M-5 (10-32) Female Thread (Shipped with M-5 (10-32) Male Buna-N O-ring face seal to 1/8" Female NPT fittings.)
2 sccm to 50 sccm	1.0	4.1"H x 2.4"W x 1.1"D	1/8" NPT Female
100 sccm to 20 slpm	1.0	4.4"H x 4.0"W x 1.6"D	1/4" NPT Female
50 slpm	2.0	5.0"H x 4.0"W x 1.6"D	1/2" NPT Female
100 slpm	2.5	5.0"H x 4.0"W x 1.6"D	3/4" NPT Female
250 slpm	2.1	5.0"H x 4.0"W x 1.6"D	(A 1-1/4" NPT Female optional process connection is available for 2000 slpm meters.)
500 slpm	4.0	5.3"H x 5.2"W x 2.9"D	1-1/4" NPT Female
1000 slpm	6.0	5.3"H x 5.2"W x 2.9"D	
1500 slpm	9.0		
2000 slpm	5.0		
3000 slpm	7.1		

1. Lower Pressure Drops Available, please see our **WHISPER-Series** mass flow controllers at www.alicat.com/whisper.
2. Compatible with Beswick®, Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. VCR and SAE connections upon request.