

MS/MCS Series

Mass Flow Measurement and Control for Corrosive Gases



alicat.com/msmcs

Series Overview

Alicat Scientific MS-Series digital mass flow meters accurately and rapidly measure the mass flow rate, volumetric flow rate, pressure and temperature of corrosive process gases such as NH₃, H₂S and SiH₄. MCS-Series mass flow controllers further provide precise control of mass flow, volumetric flow and pressure via customized high-speed proportional control valves.

At the heart of Alicat's MS/MCS-Series mass flow meters and controllers 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. Alicat backs MS/MCS-Series mass flow meters and controllers with NIST-traceable calibration, free technical phone support and a lifetime warranty.

Alicat MS/MCS-Series mass flow meters and controllers feature stainless steel flow bodies, corrosion-resistant elastomers and 34 to 36 user-selectable gas calibrations. Large integrated displays with touchpads provide a user interface for gas selection, setpoint control and PID valve tuning. The MS/MCS Series comes standard with 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 and battery operation for meters (MBS Series).



Applications

Alicat Scientific MS/MCS-Series digital mass flow meters and controllers are best suited to processes that require the use of corrosive gases, such as semiconductor and solar PV manufacturing. Multi-variable measurement and control functionality, multiple gas calibrations and a low 100:1 turndown ratio allow a single MS/MCS-Series meter or controller to replace several application-specific devices. Available 0.4% accuracy, 0.2% full-scale repeatability and <100 ms control response times optimize gas control processes.

The MS/MCS Series is available in full-scale mass flow rates from 0-0.5 sccm to 0-3000 slpm.

Technical Data for Alicat **MCS** and **MCRS** Mass Flow Controllers
0 – 0.5 sccm Full Scale through 0 – 3000 slpm Full Scale

Alicat MCS and MCRS instruments are built for use with certain aggressive gases.

Standard Specifications (Contact Alicat for available options.)

Performance	MCS & MCRS Mass Flow Controller
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.
Repeatability	± 0.2% Full Scale
Zero Shift and Span Shift	0.02% Full Scale / °Celsius / Atm
Operating Range / Turndown Ratio	1% to 100% Full Scale / 100:1 Turndown
Maximum Controllable Flow Rate	102.4% Full Scale
Typical Response Time	100 ms (Adjustable)
Warm-up Time	< 1 Second

Operating Conditions	MCS & MCRS Mass Flow Controller
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	MCS: None MCRS: Mount with valve cylinder vertical & upright
Valve Type	Normally Closed
Ingress Protection	IP40
Wetted Materials	316LSS, 303SS, 430FRSS, FFKM (Kalrez) standard, Viton, EPDM, Buna, Neoprene as needed for some gases. If your application demands a different material, please contact Alicat.

Communications / Power	MCS & MCRS Mass Flow Controller
Monochrome LCD or Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
Digital Input / Output Signal ¹ Options	RS-232 Serial / RS-485 Serial / PROFIBUS ³
Analog Input / Output Signal ² Options	0-5 Vdc / 1-5 Vdc / 0-10 Vdc / 4-20 mA
Optional Secondary Analog Input/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	MCS: 12 to 30 Vdc (15-30 Vdc for 4-20 mA outputs) MCRS: 24 to 30 Vdc
Supply Current	MCS: 0.250 Amp MCRS: 0.750 Amp
<p>1. The Digital Output Signal communicates Mass Flow, Volumetric Flow, Pressure and Temperature</p> <p>2. The Analog Output Signal and Optional Secondary Analog Output Signal communicate your choice of Mass Flow, Volumetric Flow, Pressure or Temperature</p> <p>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)</p>	

Features	MCS and MCRS Mass Flow Controller
35 Gas Select™ 35 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, Ammonia, Hydrogen Sulfide, Nitric Oxide, Nitrogen Trifluoride, Propylene.</p> <p>Alicat's MCS & MCRS controllers are also compatible with these aggressive gases: Nitrogen Dioxide to 0.5% in an inert carrier, Refrigerant gases (www.alicat.com/ms)</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>

Range Specific Specifications

Full Scale Flow Mass Controller	Pressure Drop ¹ at FS Flow (psid) venting to atmosphere	Mechanical Dimensions	Process Connections ²
MCS 0.5 sccm to 50 sccm	1.0	4.4"H x 3.4"W x 1.1"D	M-5 (10-32) Female Thread ³
MCS 100 sccm to 500 sccm	1.0	4.6"H x 3.6"W x 1.1"D	1/8" NPT Female
MCS 1 slpm	1.5		
MCS 2 slpm	3.0		
MCS 5 slpm	2.0		
MCS 10 slpm	5.5		
MCS 20 slpm	20.0		
MCRS 50 slpm	2.0	5.7"H x 7.7"W x 2.3"D	1/4" NPT Female
MCRS 100 slpm	3.2	6.0"H x 7.7"W x 2.3"D	1/2" NPT Female
MCRS 250 slpm	2.4		
MCRS 500 slpm	6.5		
MCRS 1000 slpm	14.0		
MCRS 1500 slpm	17.0	6.0"H x 7.3"W x 2.3"D	3/4" NPT Female (A 1-1/4" NPT Female process connection is available for 2000 slpm controllers.)
MCRS 2000 slpm	28.6		
MCRS 3000 slpm	16.8	6.0"H x 8.9"W x 2.9"D	1-1/4" NPT Female
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. 3. Shipped with M-5 (10-32) Male Buna-N O-ring face seal to 1/8" Female NPT fittings.			