

Technical Data for MCS-Series Mass Flow Controllers

0.5 sccm full scale through 12,000 SLPM full scale

Standard specifications. Consult Alicat for available options.



+1 (888) 290-6060
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SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.8\%$ of reading and $\pm 0.2\%$ of full scale High accuracy (≥ 5 sccm and ≤ 500 SLPM): $\pm 0.4\%$ of reading and $\pm 0.2\%$ of full scale
Flow repeatability (2σ)	$\pm 0.2\%$ of full scale
Pressure accuracy ¹	$\pm 0.5\%$ of full scale
Steady state control range	1 – 100% of full scale (100:1 turndown ratio)
Operating pressure range	11.5 – 160 PSIA
Pressure sensitivity	Mass flow zero shift and span shift: $\pm (0.08\%$ of reading + 0.02% of full scale) per atm from tare pressure
Temperature sensitivity	Mass flow zero shift and span shift: $\pm 0.02\%$ of full scale per °C from 25°C
Temperature accuracy	$\pm 0.75^\circ\text{C}$
Operating temperature range	$-10 - 60^\circ\text{C}$ (ambient and gas)
Valve function	Normally closed
Totalizer volume uncertainty	$\pm 0.1\%$ of reading in additional uncertainty
Sensor response time	< 1 ms
Typical control response time	For 63% of step change (T63), user-adjustable: 0.5 sccm–5 sccm: 100–4000 ms 10 sccm–20 SLPM: 30–4000 ms 50 SLPM–12,000 SLPM: 30–150 ms
Typical indication response time	0.5 sccm–5 sccm: 100–4000 ms 10 sccm–20 SLPM: < 10 ms 50 SLPM–12,000 SLPM: 65–255 ms
Typical warm-up time	< 1 s

¹ Stated accuracy is after tare (for mass flow), under equilibrium conditions, includes repeatability and linearity.

MECHANICAL	
Wetted materials	316L / 303 / 430FR stainless steel, FFKM standard, FKM or EPDM as needed for some gases. MCRS/MCRHS: Add 410 stainless steel and PTFE
Maximum pressure	Damage possible above 200 PSIA common mode pressure. Damage possible above 75 PSID differential pressure.
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting orientation sensitivity	MCRS and MCRHS-Series: Mount with valve cylinders vertical and upright All others: None after tare
Mounting holes	0.5 sccm–20 SLPM: $2 \times 8\text{-}32$ UNC threaded $\nabla 0.175''$ [4.45 mm] 50 SLPM–12,000 SLPM: $4\text{-}8 \times 8\text{-}32$ UNC threaded $\nabla 0.330''$ [8.38 mm]

POWER AND COMMUNICATIONS	
Digital input and output options	RS-232 Serial and Modbus RTU (default), RS-485 Serial and Modbus RTU, Modbus TCP/IP, DeviceNet, EtherCAT, EtherNet/IP, PROFINET, PROFIBUS, IO-Link
Digital data update rate ²	40 Hz at 19200 baud
Analog input and output options	4 – 20 mA, 0 – 5 Vdc, 1 – 5 Vdc, 0 – 10 Vdc
Analog data update rate	1 kHz
Analog signal accuracy	$\pm 0.1\%$ of full scale additional uncertainty
Interactive display	Monochrome LCD or color TFT display with integrated touchpad; simultaneously displays mass flow, volumetric flow, temperature, setpoint, and pressure
Display update rate	10 Hz
Electrical connection options	6-pin locking, 8-pin mini-DIN, 8-pin M12, 9-pin DB-9, 15-pin DB-15 (contact Alicat for custom pinouts)
Power requirements ²	MCS: 12 – 30 Vdc, 250 mA MCRS (≤ 3000 SLPM): 24 Vdc, 1 A MCRHS (Dual rolamite valves): 24 – 30 Vdc, 2 A MCRS (> 5000 SLPM): 24 – 30 Vdc, 2.1 A Add 40 mA if equipped with 4 – 20 mA output

² Consult the individual operating bulletins for specific industrial protocol power requirements and data transmission specifications.

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FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	128 user selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature and pressure ranges for highest accuracy.
COMPOSER™	20 user definable gas mixes. Each mix may have up to 5 gases with 0.01% composition resolution.

RANGE-SPECIFIC TECHNICAL DATA			
Full scale flow	Type	Pressure drop at full scale when venting air to atmosphere	Default process connections ³
0.5 sccm	MCS	1.0 PSID	M5 female (10-32 compatible) ⁴
1 – 5 sccm	MCS	2.0 PSID	M5 female (10-32 compatible) ⁴
10 sccm	MCS	2.8 PSID	M5 female (10-32 compatible) ⁴
50 sccm	MCS	1.0 PSID	M5 female (10-32 compatible) ⁴
100 – 500 sccm	MCS	1.0 PSID	1/8" NPT female
1 SLPM	MCS	1.5 PSID	1/8" NPT female
2 SLPM	MCS	3.0 PSID	1/8" NPT female
5 SLPM	MCS	2.0 PSID	1/8" NPT female
10 SLPM	MCS	5.5 PSID	1/8" NPT female
20 SLPM	MCS	20.0 PSID	1/8" NPT female
50 SLPM	MCRS	2.5 PSID	1/4" NPT female
100 SLPM	MCRS	2.5 PSID	1/4" NPT female
250 SLPM	MCRS	2.4 PSID	1/2" NPT female
500 SLPM	MCRS	6.5 PSID	3/4" NPT female
1000 SLPM	MCRS	14.0 PSID	3/4" NPT female
2000 SLPM	MCRS	28.6 PSID	3/4" NPT female (1 1/4" NPT connection available)
3000 SLPM	MCRS	16.8 PSID	1 1/4" NPT female
5000 SLPM	MCRHS	14.1 PSID	1 1/2" NPT female
10,000 SLPM	MCRS	30.0 PSID	2" NPT female
11,000 SLPM	MCRS	40.0 PSID	2" NPT female
12,000 SLPM	MCRS	72.0 PSID	2" NPT female

³ Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok®-compatible (including tube, VCO®, and VCR®).

⁴ Shipped with 316SS M-5 (10-32) male FFKM O-ring face seal to 1/8" NPT female fittings.

Technical Data for MCS-Series Mass Flow Controllers

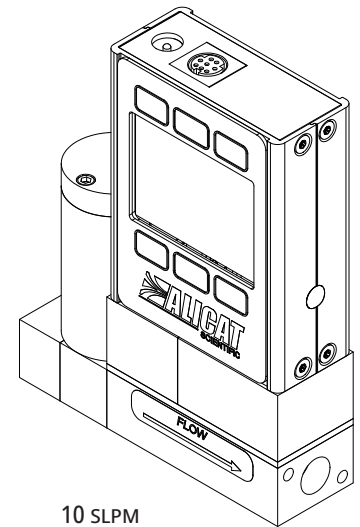
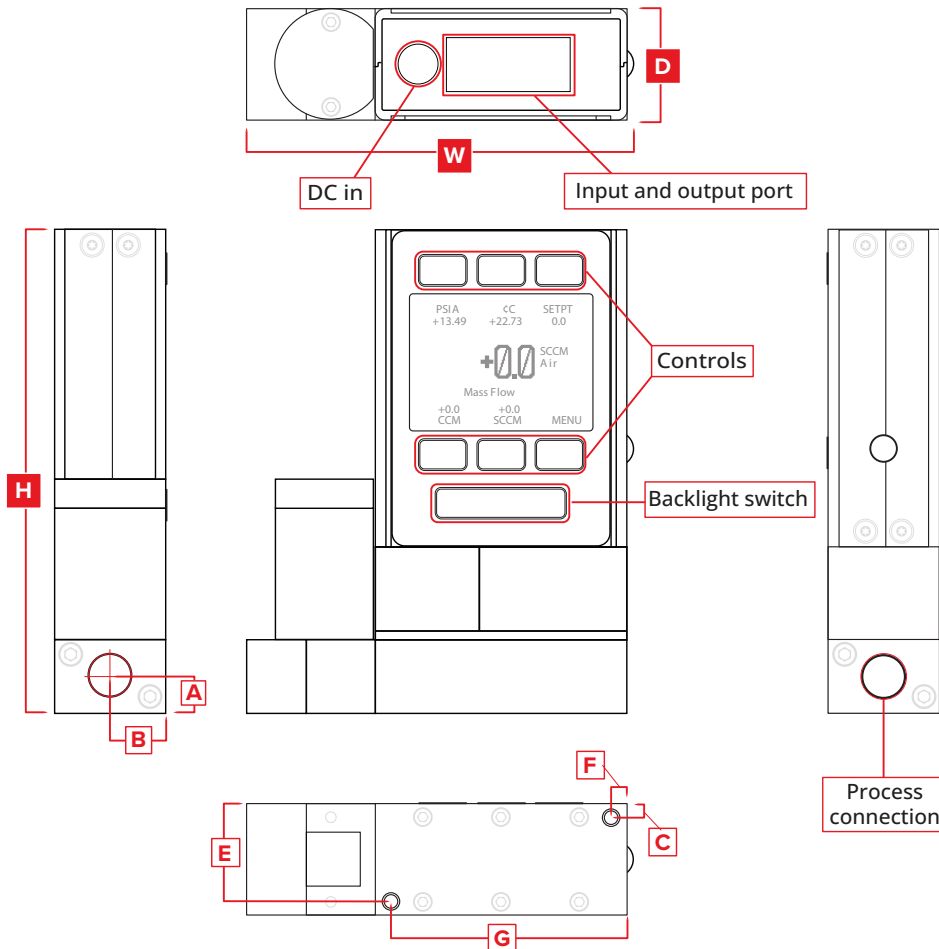
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Representative Example



DIMENSIONS											WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	
0.5 – 50 sccm	MCS	3.34"	1.05"	4.40"	0.34"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.1 lb
		84.8 mm	26.7 mm	111.7 mm	8.5 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.5 kg
100 sccm – 20 SLPM	MCS	3.59"	1.05"	4.57"	0.35"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.2 lb
		91.1 mm	26.7 mm	116.0 mm	8.9 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.5 kg

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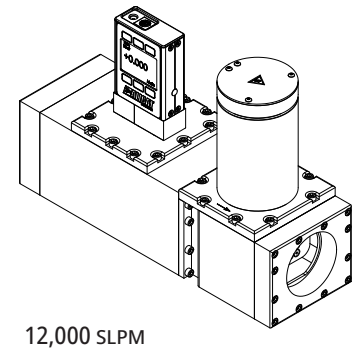
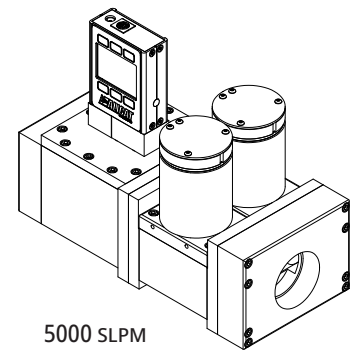
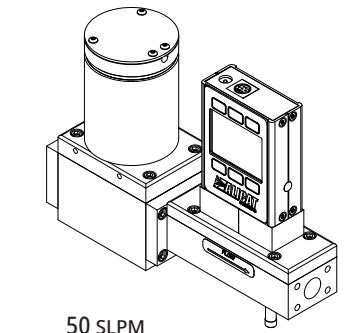
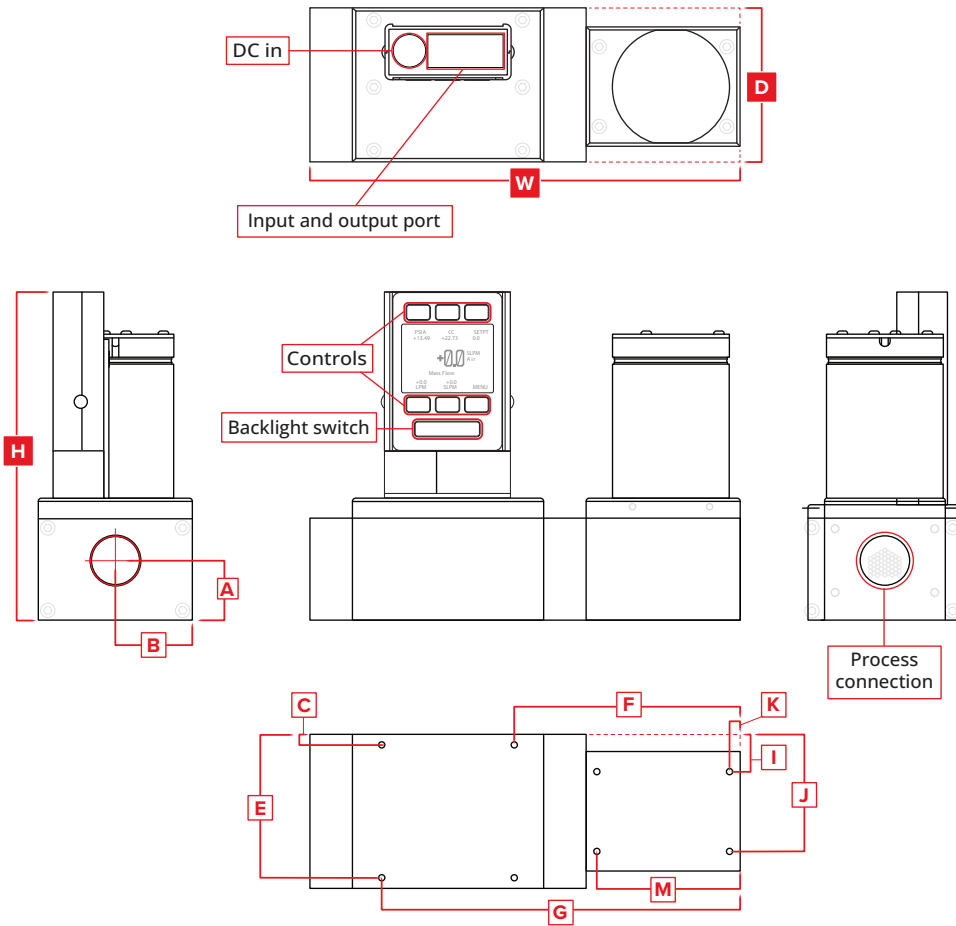
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		DIMENSIONS												WEIGHT			
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	I	J	K	M			
50 – 100 SLPM	MCRS	8.03"	2.25"	6.3	1.12"	1.13"	—	—	—	—	0.38"	1.88"	4.95"	7.45"	≈ 9.0 lb		
		204.0 mm	57.2 mm	139.7 mm	28.4 mm	28.6 mm	—	—	—	—	9.5 mm	47.6 mm	125.7 mm	189.2 mm	≈ 4.1 kg		
250 SLPM	MCRS	7.65"	2.25"	5.50"	1.12"	1.13"	0.18"	1.43"	4.40"	6.90"	0.38"	1.88"	0.58"	3.08"	≈ 9.0 lb		
		194.3 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	4.4 mm	36.2 mm	111.8 mm	175.3 mm	9.5 mm	47.6 mm	14.6 mm	78.1 mm	≈ 4.1 kg		
500 – 1000 SLPM	MCRS	7.28"	2.25"	6.3	1.12"	1.13"	0.18"	1.43"	4.03"	6.53"	0.38"	1.88"	0.20"	2.70"	≈ 9.0 lb		
		184.8 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	4.4 mm	36.2 mm	102.2 mm	165.7 mm	9.5 mm	47.6 mm	5.1 mm	68.6 mm	≈ 4.1 kg		
2000 SLPM	MCRS	8.10"	2.90"	6.3	1.12"	1.45"	0.20"	2.70"	4.25"	6.75"	0.70"	2.20"	0.20"	2.70"	≈ 12.0 lb		
		205.7 mm	73.7 mm	139.6 mm	28.4 mm	36.8 mm	5.1 mm	68.6 mm	108.0 mm	171.5 mm	17.8 mm	55.9 mm	5.1 mm	68.6 mm	≈ 5.4 kg		
3000 SLPM	MCRS	8.90"	2.90"	6.3	0.96"	1.45"	0.20"	2.70"	5.05"	7.55"	0.70"	2.20"	1.00"	3.50"	≈ 12.0 lb		
		226.1 mm	73.7 mm	139.6 mm	24.4 mm	36.8 mm	5.1 mm	68.6 mm	128.3 mm	191.8 mm	17.8 mm	55.9 mm	25.4 mm	88.9 mm	≈ 5.4 kg		
5000 SLPM	MCRHS	10.00"	4.50"	7.13	1.45"	2.25"	0.63"	3.88"	5.96"	8.46"	—	—	—	—	≈ 28.0 lb		
		254.0 mm	114.3 mm	160.8 mm	36.8 mm	57.2 mm	16.0 mm	98.6 mm	151.3 mm	214.8 mm	—	—	—	—	≈ 12.7 kg		
10,000 – 12,000 SLPM	MCRS	12.00"	3.84"	7.96"	1.70"	1.92"	0.30"	3.55"	6.45"	8.95"	0.52"	3.32"	1.60"	3.60"	≈ 32.0 lb		
		304.8 mm	97.5 mm	202.3 mm	43.2 mm	48.8 mm	7.5 mm	90.0 mm	163.8 mm	227.3 mm	13.2 mm	84.3 mm	40.6 mm	91.4 mm	≈ 14.5 kg		