

# Technical Data for MCQ-Series Mass Flow Controllers

50 SLPM full scale through 12,000 SLPM full scale

Standard specifications. Consult Alicat for available options.



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SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy <sup>1</sup>	± 2% of full scale
Flow repeatability (2σ)	± (0.1% of reading + 0.02% of full scale)
Pressure accuracy <sup>1</sup>	Above 1 atm: ± 0.5% of reading Below 1 atm: ± 0.07 PSIA
Steady state control range	0.5 – 100% of full scale (200:1 turndown ratio)
Operating pressure	11.5 – 320 PSIA
Pressure sensitivity	Mass flow zero shift: ± 0.01% of full scale per atm from tare pressure Mass flow span shift: ± 0.1% of reading per atmosphere from calibration conditions
Temperature sensitivity	Mass flow zero and span shift: ± 0.01% of full scale per °C from 25°C
Temperature accuracy	± 0.75°C
Operating temperature range	-10 – 60°C (ambient and gas)
Valve function	Normally closed
Totalizer volume uncertainty	± 0.1% of reading additional uncertainty
Sensor response time	< 1 ms
Typical control response time	As fast as 100 ms (T63), flow rate dependent, user-adjustable
Typical indication response time	< 10 ms, flow rate dependent
Typical warm-up time	< 1 s

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

MECHANICAL	
Wetted materials	302, 303, 304, 316L, and 410 stainless steel; FKM, alumina ceramic, Delrin®, glass, gold, heat-cured epoxy, heat-cured silicone rubber, nylon, polyamide, silicon
Maximum pressure	Damage possible above 400 PSIA common mode pressure.
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting orientation sensitivity	Valves must be upright
Mounting holes	4-8× 8-32 UNC threaded ⌀ 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 <sup>2</sup>	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	± 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
Power requirements <sup>2</sup>	MCR (≤ 3000 SLPM): 24 Vdc, 1 A MCRH (dual Rolamite valves): 24 Vdc, 2 A MCR (> 5000 SLPM): 24 Vdc, 2.1 A Add 40 mA if equipped with 4–20 mA output

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

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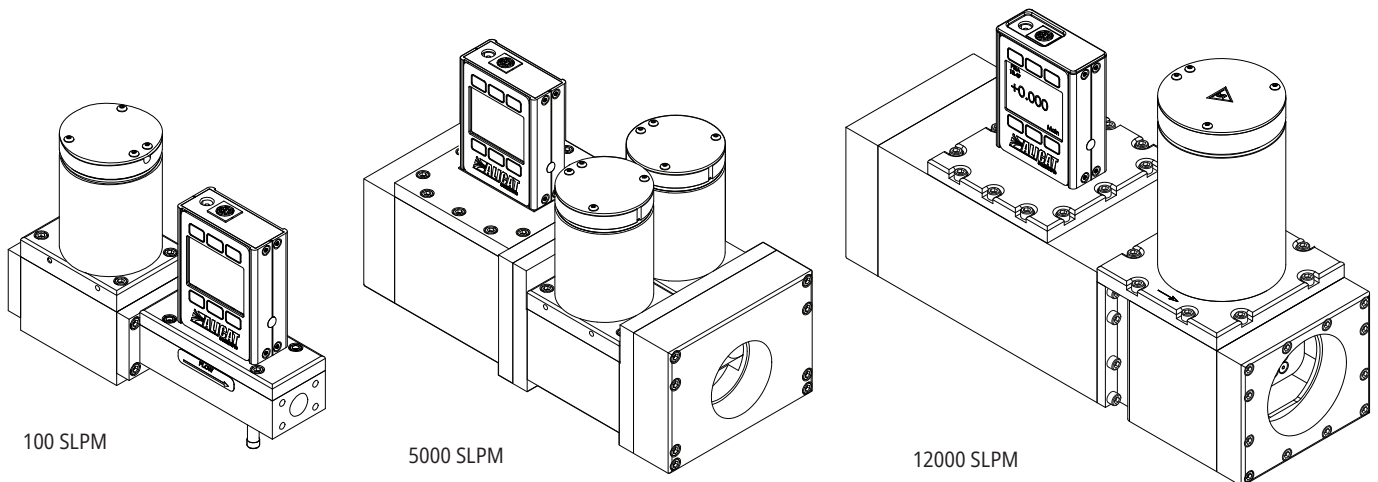
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FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 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 <sup>3</sup>
50 SLPM	MCRQ	2.0 PSID	¼" NPT female
100 SLPM	MCRQ	3.2 PSID	¼" NPT female
250 SLPM	MCRQ	2.4 PSID	½" NPT female
500 SLPM	MCRQ	6.5 PSID	¾" NPT female
1000 SLPM	MCRQ	14.0 PSID	¾" NPT female
2000 SLPM	MCRQ	8.6 PSID	¾" NPT female
3000 SLPM	MCRQ	16.8 PSID	1¼" NPT female
5000 SLPM	MCRHQ	14.1 PSID	1½" NPT female
10,000 SLPM	MCRQ	57.0 PSID	2" NPT female
12,000 SLPM	MCRQ	72.0 PSID	2" NPT female

<sup>3</sup> 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®).

## Representative Examples



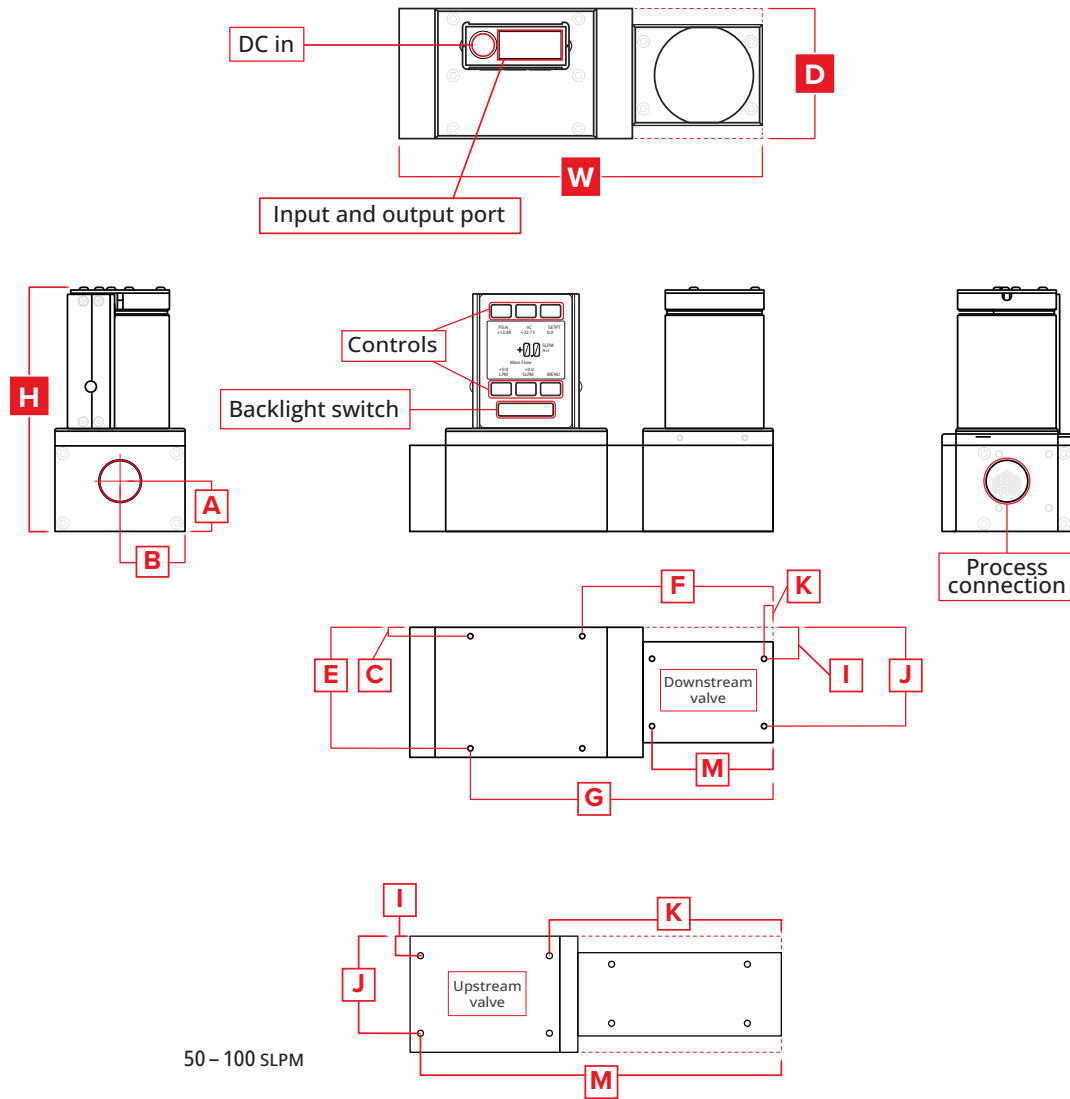
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DIMENSIONS															WEIGHT
Full scale	Type	Width	Depth	Height	A	B	C	E	F	G	I	J	K	M	
50 – 100 SLPM	MCRQ	8.03"	2.25"	5.50"	1.12"	1.13"	—	—	—	—	0.38"	1.88"	4.95"	7.45"	≈ 9.0 lb
		204.0 mm	57.2 mm	139.7 mm	28.4 mm	28.6 mm	—	—	—	—	9.5 mm	47.6 mm	125.7 mm	189.2 mm	≈ 4.1 kg
250 SLPM	MCRQ	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	MCRQ	7.28"	2.25"	5.50"	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	MCRQ	8.10"	2.90"	5.50"	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	MCRQ	8.90"	2.90"	5.50"	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	MCRHQ	10.00"	4.50"	6.33"	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	MCRQ	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