Technical Data for MCQ-Series Mass Flow Controllers

50 SLPM full scale through **3000 SLPM** full scale

Standard specifications. Consult Alicat for available options.

ALICAT SCIENTIFIC
+1 (888) 290-6060
alicat.com/mcq

CONTROL AND SENSOR PERFORMANCE	
Mass Flow Accuracy at Calibration Conditions[1]	±2% of full scale
Repeatability	±0.2% of full scale
Steady State Control Range	0.5–100% of full scale
Valve Function	Normally Closed
Temperature Sensitivity	**Mass flow zero shift:** ±0.01% of full scale per °C from tare temperature, per atm **Mass flow span shift:** ±0.01% of reading per °C from 25°C, per atm
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
Operating Temperature Range	−10–60°C
Temperature Accuracy	±0.75°C
Operating Pressure Full Scale	320 PSIA
Pressure Accuracy above 1 atm	±0.5% of reading
Pressure Accuracy below 1 atm	±0.07 PSIA
Totalizer Volume Uncertainty	±0.5% of reading additional uncertainty
Sensor Response Time	<1 ms
Typical Indication Response Time	<10 ms, flow rate dependent
Typical Control Response Time	As fast as 100 ms (T_{63}), flow rate dependent, user adjustable
Typical Warm-Up Time	<1 s

1 Stated accuracy is after tare under equilibrium conditions, includes repeatability and linearity.

MECHANICAL	
Minimum Operating Pressure	11.5 PSIA common mode pressure (consult Alicat for lower operating pressures) Differential pressure must exceed model pressure drop, see below for details
Maximum Operating Pressure	Damage possible above 400 PSIA common mode pressure Damage possible above 75 PSI differential pressure
Ingress Protection	IP40 (consult Alicat for weatherproofing options)
Humidity Range	0–95%, non-condensing
Wetted Materials	302, 303, 304, 316L, 410 and 430FR stainless steel; FKM, alumina ceramic, brass, glass, gold, heat-cured epoxy, heat-cured silicone rubber, polyamide, silicon

CONTROL AND COMMUNICATIONS	
Analog I/O Options	4–20 mA, 0–5 VDC, 1–5 VDC, 0–10 VDC
Digital I/O Options	RS-232 Serial by default RS-485 Serial, Modbus RTU (over RS-232 or RS-485), Modbus TCP/IP, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS
Electrical Connection Options	6-pin locking, 8-pin mini-DIN, 8-pin M12, DB-9, DB-15
Power Requirements[2]	24 VDC, 1 A Add 40 mA if equipped with 4–20 mA output
Serial Data Update Rate[2]	40 Hz at 19200 baud
Analog Data Update Rate	1 kHz
Display Update Rate	10 Hz
Analog Signal Accuracy	±0.1% of full scale additional uncertainty

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
Monochrome LCD or Color TFT Display with Integrated Touchpad	Simultaneously displays mass flow, volumetric flow, temperature, setpoint, and pressure
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 precision.

RANGE-SPECIFIC TECHNICAL DATA

Full scale flow	Type	Pressure drop at full scale flow[3]	Process connections[4]	Mount tap size
50 SLPM	MCRQ	2.0 PSID	¼" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
100 SLPM	MCRQ	3.2 PSID	¼" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
250 SLPM	MCRQ	2.4 PSID	½" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
500 SLPM	MCRQ	6.5 PSID	¾" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
1000 SLPM	MCRQ	14.0 PSID	¾" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
1500 SLPM	MCRQ	17.0 PSID	¾" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
2000 SLPM	MCRQ	28.6 PSID	¾" NPT female	4× 8-32 UNC 0.330 in [8.38 mm]
3000 SLPM	MCRQ	16.8 PSID	1¼" NPT female	4× 8-32 UNC 0.330 in [8.38 mm]

3 Default valve venting air to atmosphere.

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

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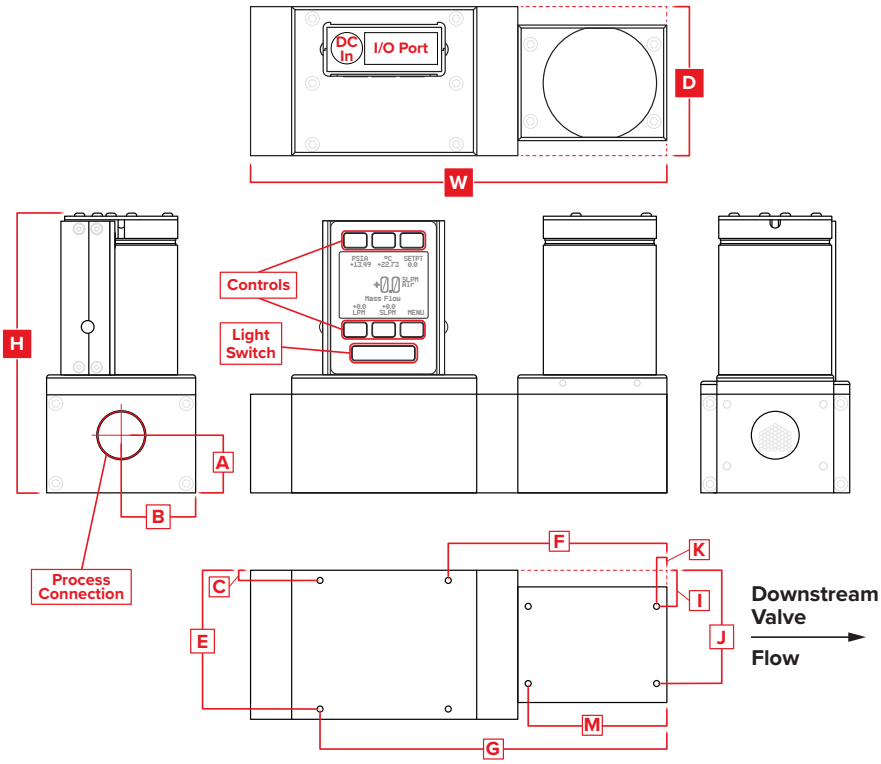
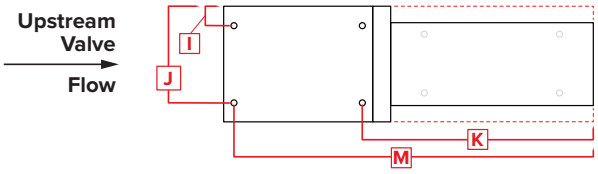
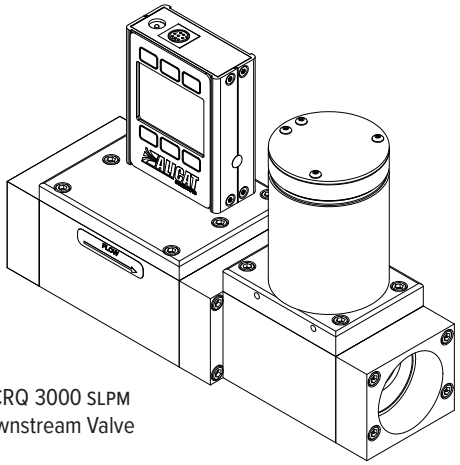
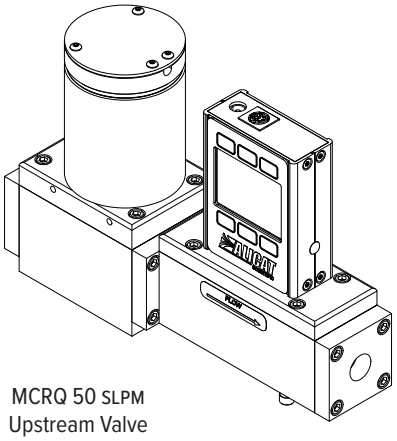




Representative Examples



MCRQ 3000 SLPM
Downstream Valve



MCRQ 50 SLPM
Upstream Valve

DIMENSIONS															WEIGHT
Full scale	Type	Height	Width	Depth	A	B	C	E	F	G	I	J	K	M	
50–100 SLPM	MCRQ	5.495 in	8.025 in	2.250 in	1.120 in	1.125 in	—	—	—	—	0.375 in	1.875 in	4.950 in	7.450 in	≈ 9.0 lb
		139.57 mm	203.84 mm	57.15 mm	28.45 mm	28.58 mm	—	—	—	—	9.53 mm	47.63 mm	125.73 mm	189.23 mm	≈ 4.1 kg
250 SLPM	MCRQ	5.495 in	7.650 in	2.250 in	1.120 in	1.125 in	—	—	—	—	0.375 in	1.875 in	4.575 in	7.075 in	≈ 9.0 lb
		139.57 mm	194.31 mm	57.15 mm	28.45 mm	28.58 mm	—	—	—	—	9.53 mm	47.63 mm	116.21 mm	179.71 mm	≈ 4.1 kg
500–1000 SLPM	MCRQ	5.495 in	7.275 in	2.250 in	1.120 in	1.125 in	—	—	—	—	0.375 in	1.875 in	4.575 in	7.075 in	≈ 9.0 lb
		139.57 mm	184.79 mm	57.15 mm	28.45 mm	28.58 mm	—	—	—	—	9.53 mm	47.63 mm	116.21 mm	179.71 mm	≈ 4.1 kg
2000 SLPM	MCRQ	5.495 in	8.100 in	2.900 in	1.120 in	1.450 in	0.200 in	2.700 in	4.250 in	6.750 in	0.700 in	2.200 in	0.200 in	2.700 in	≈ 12.0 lb
		139.57 mm	205.74 mm	73.66 mm	28.45 mm	36.83 mm	5.08 mm	68.58 mm	107.95 mm	171.45 mm	17.78 mm	55.88 mm	5.08 mm	68.58 mm	≈ 5.4 kg
3000 SLPM	MCRQ	5.495 in	8.900 in	2.900 in	0.960 in	1.450 in	0.200 in	2.700 in	5.050 in	7.550 in	0.700 in	2.200 in	1.000 in	3.500 in	≈ 12.0 lb
		139.57 mm	226.06 mm	73.66 mm	24.38 mm	36.83 mm	5.08 mm	68.58 mm	128.27 mm	191.77 mm	17.78 mm	55.88 mm	25.40 mm	88.90 mm	≈ 5.4 kg