

Technical Data for MC-Series Mass Flow Controllers

50 SLPM full scale through 12,000 SLPM full scale

Standard specifications. Consult Alicat for available options.



+1 (888) 290-6060
alicat.com/mc

SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.8\%$ of reading and $\pm 0.2\%$ of full scale High accuracy (≤ 500 models): $\pm 0.4\%$ of reading and $\pm 0.2\%$ of full scale
Flow repeatability (2σ)	$\pm 0.2\%$ of reading and $\pm 0.02\%$ of full scale
Pressure accuracy ¹	Above 1 atm: $\pm 0.5\%$ of reading Below 1 atm: ± 0.07 PSIA
Steady state control range	MCP: 0.01 – 100% of full scale (10,000:1 turndown ratio) MCR and MCRH: 0.2 – 100% of full scale (500:1 turndown ratio)
Operating pressure range	11.5 – 160 PSIA
Pressure sensitivity	Mass flow zero and span shift: $\pm (0.08\% \text{ of reading} + 0.02\%)$ of full scale per atm from tare pressure
Temperature sensitivity	Mass flow zero and span shift: $\pm 0.02\%$ of full scale per $^{\circ}\text{C}$ from 25°C
Temperature accuracy	$\pm 0.75^{\circ}\text{C}$
Operating temperature range	-10 – 60°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	MCP: As fast as 30 ms (T63), flow rate dependent, user-adjustable MCR and MCRH: 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

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

MECHANICAL	
Wetted materials	MCP: 302, 303, 304, 316L, and 430FR stainless steel; FKM, alumina ceramic, brass, glass, gold, heat-cured epoxy, heat-cured silicone rubber, polyamide, silicon MCR and MCRH: 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 200 PSIA common mode pressure. Damage possible by rapid pressure change above 75 PSI differential pressure.
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting orientation sensitivity	MCP: None MCR and MCRH: Rolamite valves must be upright
Mounting holes	4-8 \times 8-32 UNC threaded \downarrow 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®, Profibus, PROFINET®, 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
Power requirements ²	MCP: 12 – 24 Vdc, 250 mA MCR (< 2000 SLPM): 24 Vdc, 0.5 A MCR (≤ 3000 SLPM): 24 Vdc, 1 A MCRH: 24 Vdc, 2 A MCR (> 5000 SLPM): 24 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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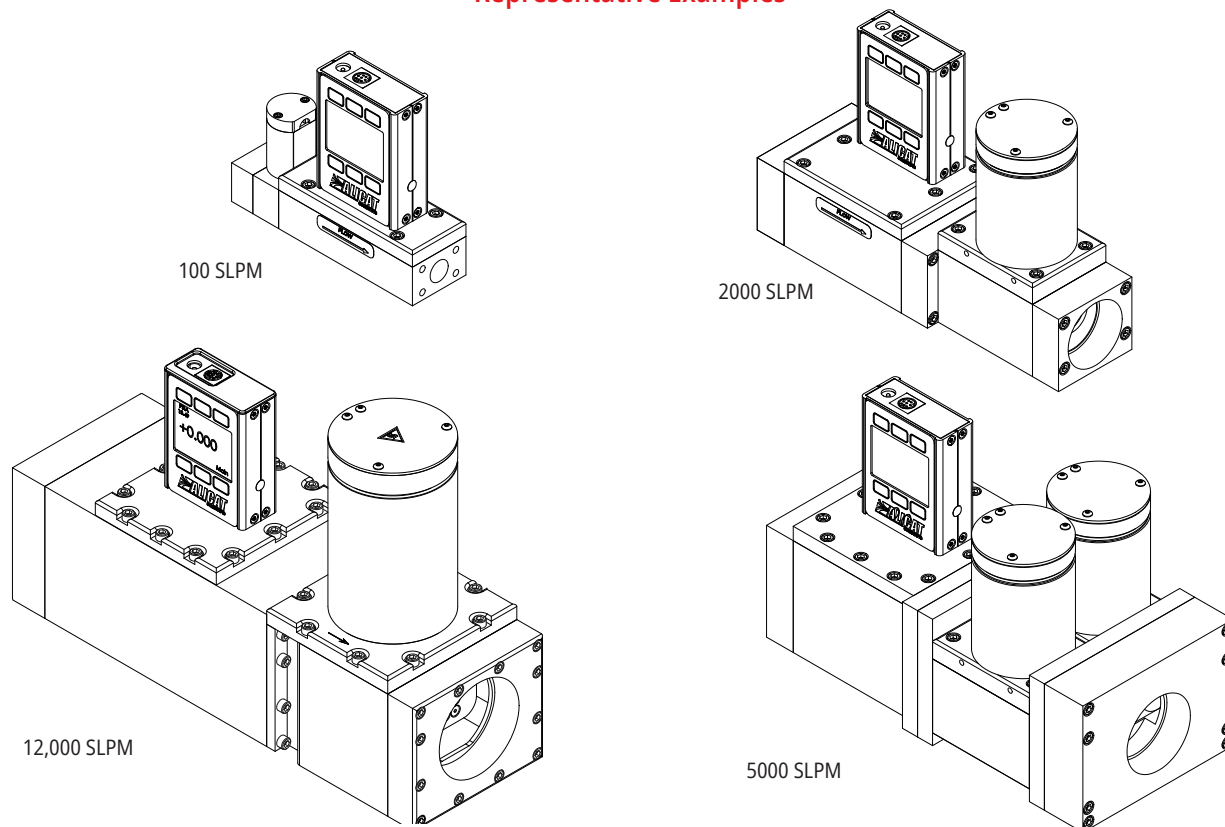
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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 ³	Default process connections ⁴
50 SLPM	MCP	5.0 PSID	¼" NPT female
100 SLPM	MCP	15.5 PSID	¼" NPT female
250 SLPM	MCR	2.4 PSID	½" NPT female
500 SLPM	MCR	6.5 PSID	¾" NPT female
1000 SLPM	MCR	14.0 PSID	¾" NPT female
2000 SLPM	MCR	28.6 PSID	¾" NPT female (1¼" NPT connection available)
3000 SLPM	MCR	16.8 PSID	1¼" NPT female
5000 SLPM	MCRH	14.1 PSID	1½" NPT female
10,000 SLPM	MCR	30.0 PSID	2" NPT female
11,000 SLPM	MCR	40.0 PSID	2" NPT female
12,000 SLPM	MCR	72.0 PSID	2" NPT female

³ Lower pressure drops and other valves available, including our WHISPER™ series mass flow controllers at alicat.com/mcw.

⁴ 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



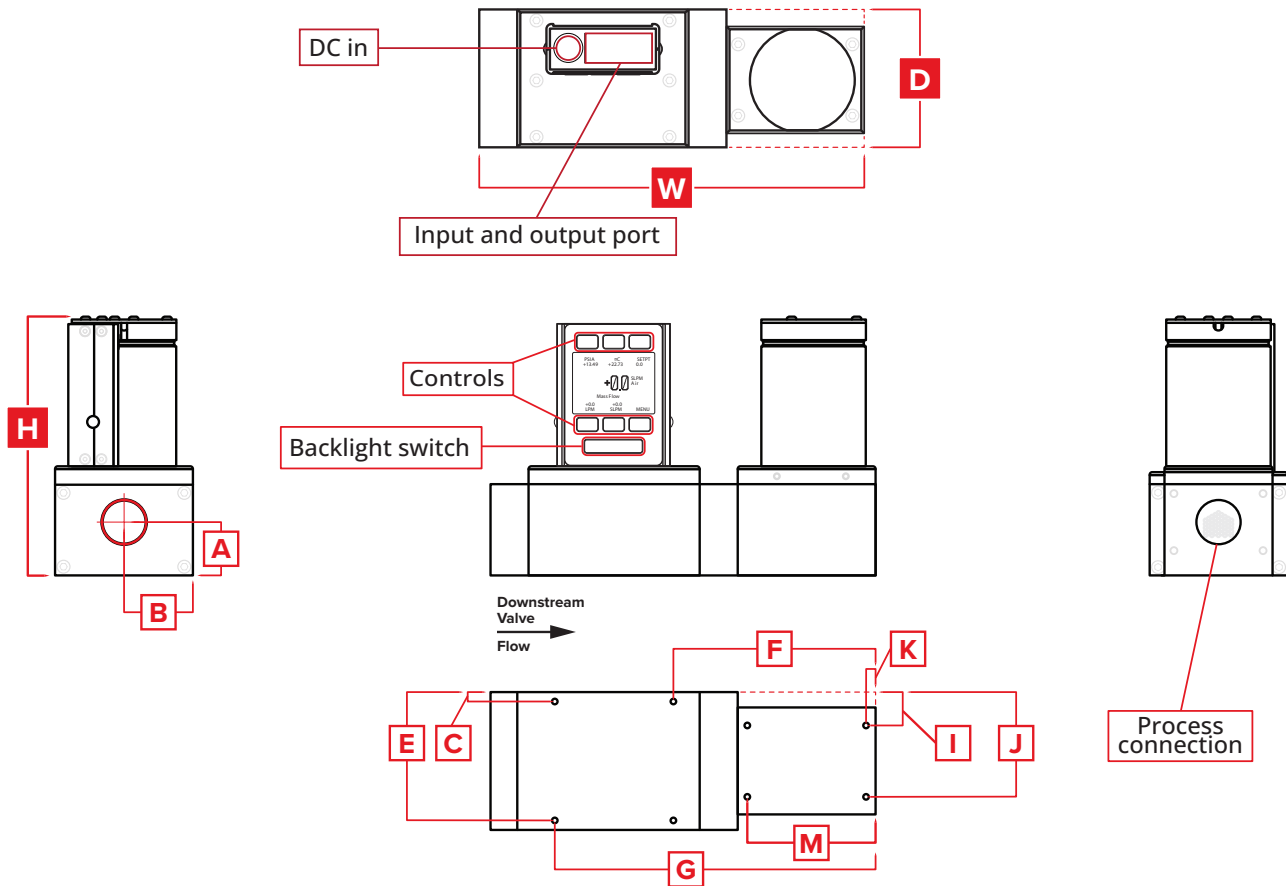
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DIMENSIONS															WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	I	J	K	M	
50 – 100 SLPM	MCP	5.41"	1.60"	4.37"	0.50"	0.80"	0.18"	1.43"	0.75"	3.25"	—	—	—	—	≈ 3.1 lb
		137.4 mm	40.6 mm	110.9 mm	12.7 mm	20.3 mm	4.4 mm	36.2 mm	19.1 mm	82.6 mm	—	—	—	—	≈ 1.4 kg
250 SLPM	MCR	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	MCR	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
		184.9 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	MCR	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	MCR	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	MCRH	9.80"	3.84"	6.27"	1.45"	1.92"	0.30"	3.55"	5.96"	8.46"	—	—	—	—	≈ 28.0 lb
		248.9 mm	97.5 mm	159.2 mm	36.8 mm	48.8 mm	7.5 mm	90.0 mm	151.3 mm	214.8 mm	—	—	—	—	≈ 12.7 kg
10,000 – 12,000 SLPM	MCR	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	163.7 mm	227.2 mm	13.2 mm	84.3 mm	40.6 mm	91.4 mm	≈ 14.5 kg