Technical Data for MC-Series Mass Flow Controllers

50 SLPM full scale through 10,000 SLPM full scale

Controllers for flow rates over 6000 SLPM are compatible with hydrogen only.
Standard specifications. Consult Alicat for available options.

ALICAT SCIENTIFIC
+1 (888) 290-6060
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SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy[1]	**Standard accuracy:** ± 0.8% of reading and ± 0.2% of full scale **High accuracy (≤ 500 SLPM models):** ± 0.4% of reading and ± 0.2% of full scale
Flow repeatability (2σ)	± 0.2% of reading and ± 0.02% of full scale
Pressure accuracy[1]	**Above 1 atm:** ± 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:** ± (0.08% of reading + 0.02%) of full scale per atm from tare pressure
Temperature sensitivity	**Mass flow zero and span shift:** ± 0.02% 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 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	**50 – 100 SLPM:** 4× 8-32 UNC threaded ↧ 0.375″ [9.53 mm] **250 – 1000 SLPM:** 4× 8-32 UNC threaded ↧ 0.328″ [8.33 mm] **2000 – 3000 SLPM:** 4× 8-32 UNC threaded ↧ 0.330″ [8.38 mm] **5000 – 10000 SLPM:** 4× 8-32 UNC threaded ↧ 0.300″ [7.62 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
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	± 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 (≥ 2000 SLPM):** 24 Vdc, 1 A **MCRH:** 24 Vdc, 2 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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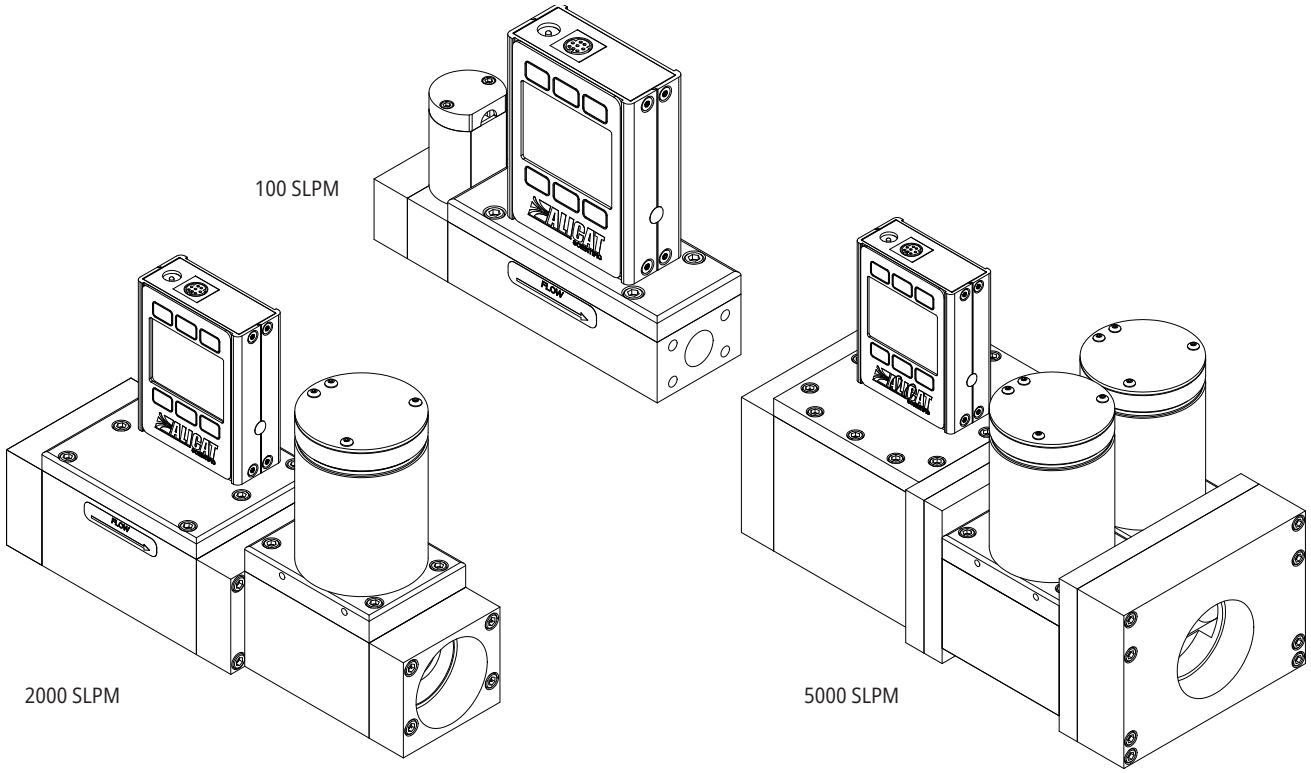
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™ [3]	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature and pressure ranges for highest accuracy.
COMPOSER™ [3]	20 user-definable gas mixes. Each mix may have up to 5 gases with 0.01% composition resolution.

3 Devices with a range of 6000 SLPM or greater are not equipped with Gas Select™ or COMPOSER™ and are only compatible with hydrogen.

RANGE-SPECIFIC TECHNICAL DATA			
Full scale flow	Type	Pressure drop at full scale when venting air to atmosphere[4]	Default process connections[5]
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 (H_2 only)	MCR	12.0 PSID [6]	1½" NPT female

4 Lower pressure drops and other valves available, including our WHISPER™ series mass flow controllers at alicat.com/mcw.
5 Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO®, and VCR®).
6 Pressure drop of 12.0 PSID is at full scale when venting hydrogen to atmosphere.

Representative Examples



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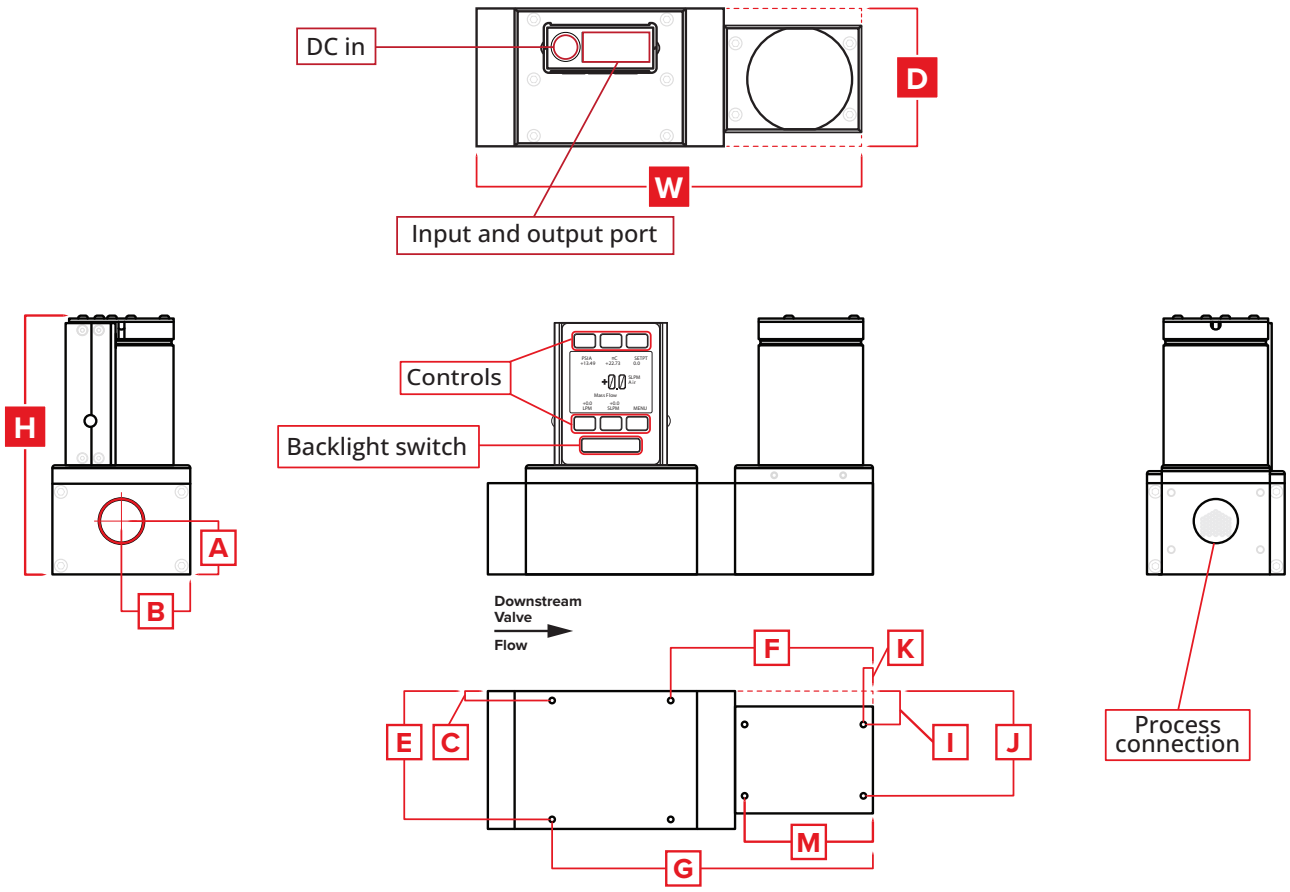

DIMENSIONS															WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	I	J	K	M	
50 – 100 SLPM	MCP	5.41″	1.60″	4.37″	0.50″	0.80″	0.18″	1.43″	0.75″	3.25″	—	—	—	—	≈ 3.1 lb
		137.4 mm	40.6 mm	110.9 mm	12.7 mm	20.3 mm	4.4 mm	36.2 mm	19.1 mm	82.6 mm	—	—	—	—	≈ 1.4 kg
250 SLPM	MCR	7.65″	2.25″	5.50″	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 SLPM (H_2 only)	MCR	9.66″	3.84″	6.33″	1.45″	1.92″	0.30″	3.25″	1.55″	2.55″	1.50″	5.72″	3.00″	—	≈ 28.0 lb
		245.4 mm	97.5 mm	160.8 mm	36.8 mm	48.8 mm	7.5 mm	82.6 mm	39.4 mm	64.8 mm	38.1 mm	145.2 mm	76.2 mm	—	≈ 12.7 kg