

# Technical Data for **MCD-Series** Bidirectional Mass Flow Controllers

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

Standard specifications. Consult Alicat for available options.



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

SENSOR AND CONTROL PERFORMANCE	
Mass Flow Accuracy at Calibration Conditions <sup>1</sup>	±0.8% of reading and ±0.2% of full scale
High Accuracy Option <sup>1</sup>	±0.4% of reading and ±0.2% of full scale Available for ≤500 SLPM models
Repeatability (2σ)	±(0.2% of reading + 0.02% of full scale)
Steady State Control Range	0.01–100% of full scale
Typical Control Response Time	As fast as 30 ms, flow rate dependent, user adjustable
Valve Function	Normally closed
Temperature Sensitivity	Mass flow zero and span shift: 0.02% of full scale per °C from 25°C
Pressure Sensitivity	Mass flow zero and span shift: ±(0.08% of reading + 0.02% of full scale) per atm from calibration conditions
Operating Temperature Range	–10–60°C
Temperature Accuracy	±0.75°C
Operating Pressure Full Scale	160 PSIA (up to 320 PSIA available with MCDQ model)
Pressure Accuracy above 1 atm	±0.5% of reading
Pressure Accuracy below 1 atm	±0.07 PSIA
Totalizer Volume Uncertainty	±0.5% of reading in additional uncertainty
Sensor Response Time	<1 ms
Typical Indication Response Time	<10 ms, flow rate dependent
Typical Warm-Up Time	<1 s

<sup>1</sup> 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 175 PSIA common mode pressure. Damage possible above 75 PSI differential pressure. Higher pressure configurations are available, contact Alicat.
Ingress Protection	IP40 (consult Alicat for weatherproofing options)
Humidity Range	0–95%, non-condensing
Wetted Materials	<b>MCPD:</b> 302, 303, 304, 316L, and 430FR stainless steel; FKM, alumina ceramic, brass, glass, gold, heat-cured epoxy, heat-cured silicone rubber, polyamide, silicon <b>MCRD:</b> Remove 430FR and add 410 stainless steel; add Delrin®

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 <sup>2</sup>	<b>MCPD (miniature valve):</b> 12–24 VDC, 250 mA <b>MCRD (Rolamite valve):</b> 24 VDC, 1 A (Add 40 mA if equipped with 4–20 mA output)
Digital Data Update Rate <sup>2</sup>	40 Hz at 19200 baud
Analog Data Update Rate <sup>2</sup>	1 kHz
Display Update Rate	10 Hz
Analog Signal Accuracy	±0.1% of full scale additional uncertainty

<sup>2</sup> 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 <sup>3</sup>	Process connections <sup>4</sup>	Mount tap size
50 SLPM	MCPD	5.0 PSID	¼" NPT female	4× 8-32 UNC 0.375 in [9.53 mm]
100 SLPM	MCPD	15.5 PSID	¼" NPT female	4× 8-32 UNC 0.375 in [9.53 mm]
250 SLPM	MCRD	2.4 PSID	½" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
500 SLPM	MCRD	6.5 PSID	¾" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
1000 SLPM	MCRD	14.0 PSID	¾" NPT female	4× 8-32 UNC 0.328 in [8.33 mm]
2000 SLPM	MCRD	28.6 PSID	¾" NPT female (1¼" NPT connection available)	4× 8-32 UNC 0.330 in [8.38 mm]
3000 SLPM	MCRD	16.8 PSID	1¼" NPT female	4× 8-32 UNC 0.330 in [8.38 mm]

<sup>3</sup> Default valve venting air to atmosphere. Lower pressure drops and other valves available, including our WHISPER™ series mass flow controllers at [www.alicat.com/mcw](http://www.alicat.com/mcw).

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

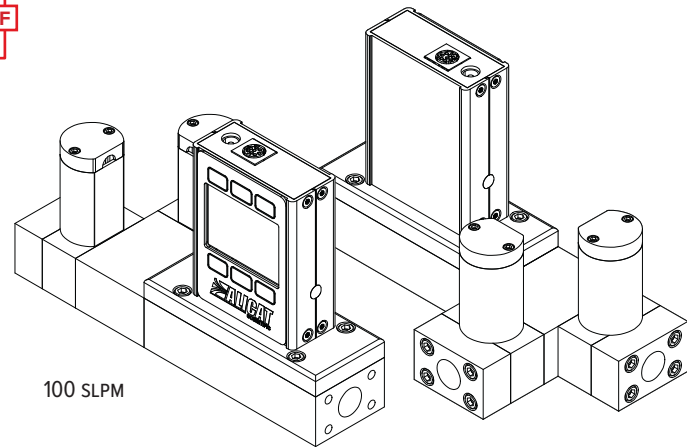
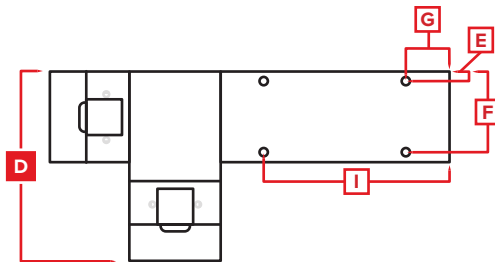
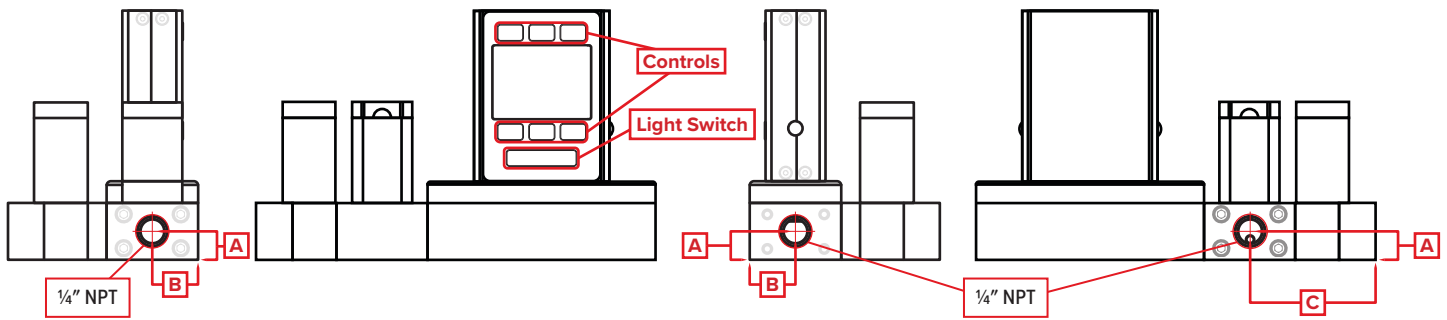
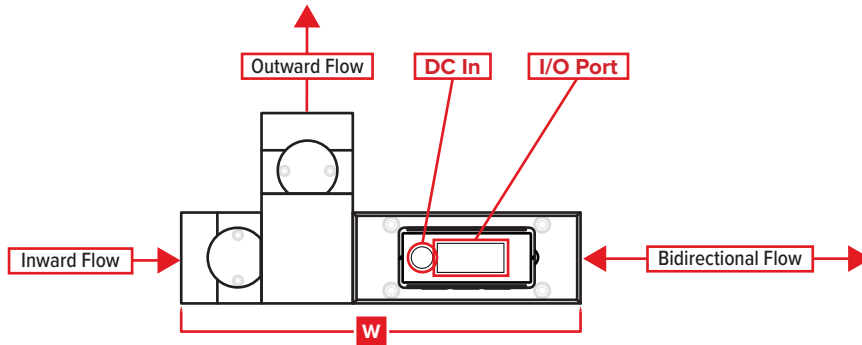
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DIMENSIONS												WEIGHT
Full scale flow	Type	Height	Width	Depth	A	B	C	E	F	G	I	
50–100 SLPM	MCPD	4.367 in	7.008 in	3.333 in	0.500 in	0.800 in	4.800 in	0.175 in	1.425 in	0.750 in	3.250 in	≈ 4.4 lb
		110.92 mm	178.00 mm	84.66 mm	12.70 mm	20.32 mm	121.92 mm	4.45 mm	36.20 mm	19.05 mm	82.55 mm	≈ 2.0 kg

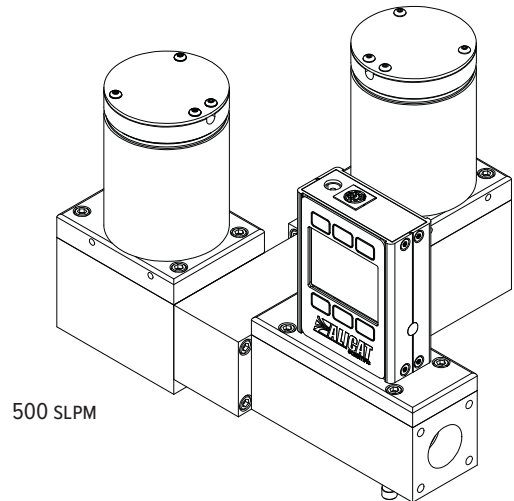
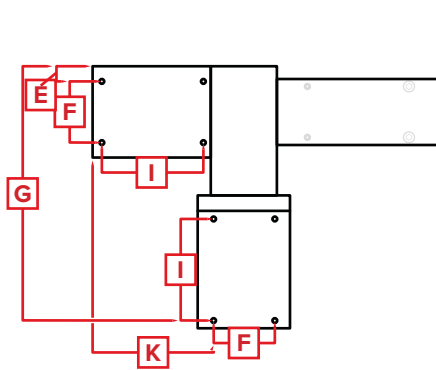
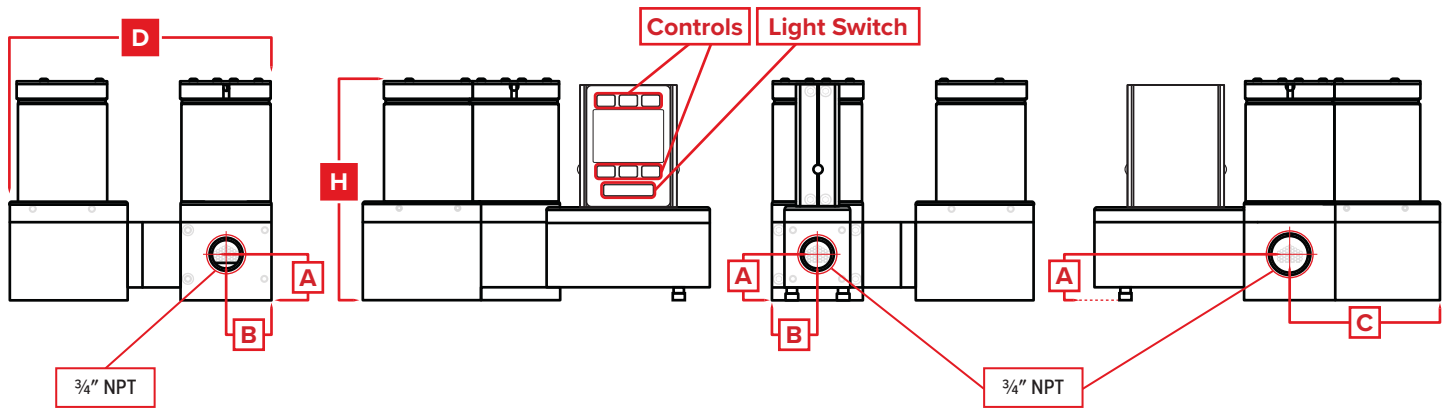
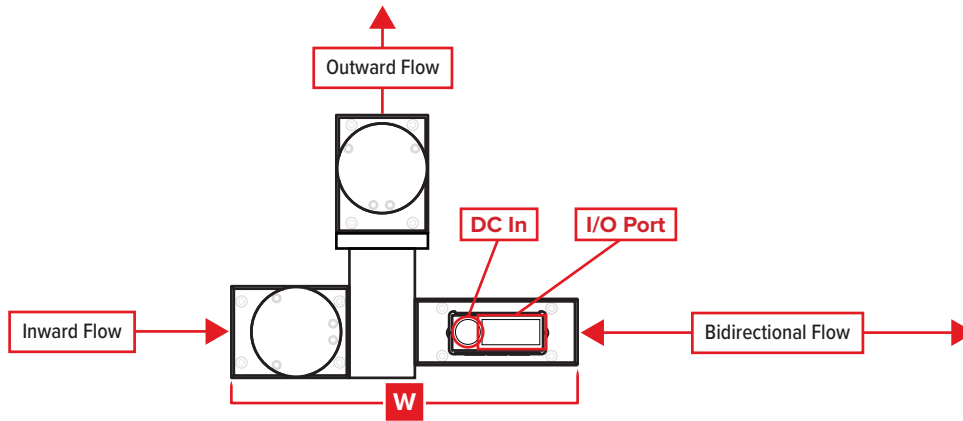
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DIMENSIONS													WEIGHT	
Full scale flow	Type	Height	Width	Depth	A	B	C	E	F	G	I	J	K	
250 SLPM	MCRD	5.495 in	8.500 in	6.450 in	1.120 in	1.125 in	3.700 in	0.375 in	1.500 in	6.250 in	2.500 in	0.200 in	2.950 in	≈ 18.3 lb
		139.57 mm	215.90 mm	163.83 mm	28.45 mm	28.58 mm	93.98 mm	9.53 mm	38.10 mm	158.75 mm	63.50 mm	5.08 mm	74.93 mm	≈ 8.3 kg
500–1000 SLPM	MCRD	5.495 in	8.500 in	6.450 in	1.120 in	1.125 in	3.700 in	0.375 in	1.500 in	6.250 in	2.500 in	0.200 in	2.950 in	≈ 18.3 lb
		139.57 mm	215.90 mm	163.83 mm	28.45 mm	28.58 mm	93.98 mm	9.53 mm	38.10 mm	158.75 mm	63.50 mm	5.08 mm	74.93 mm	≈ 8.3 kg

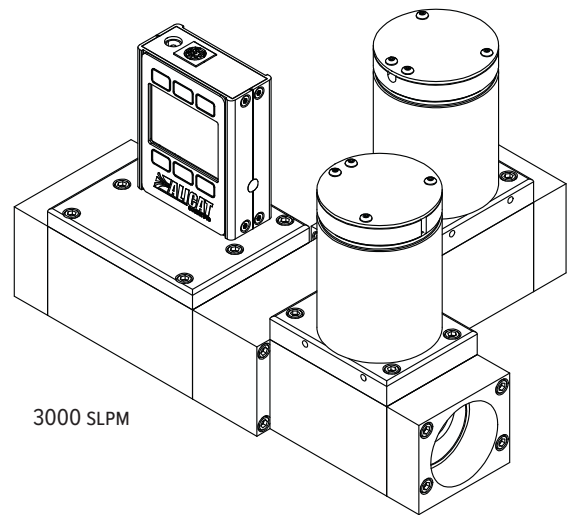
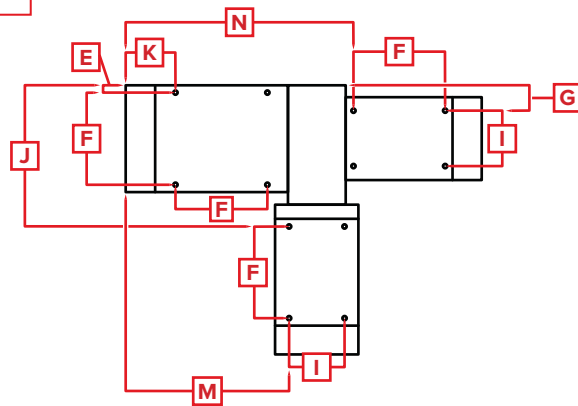
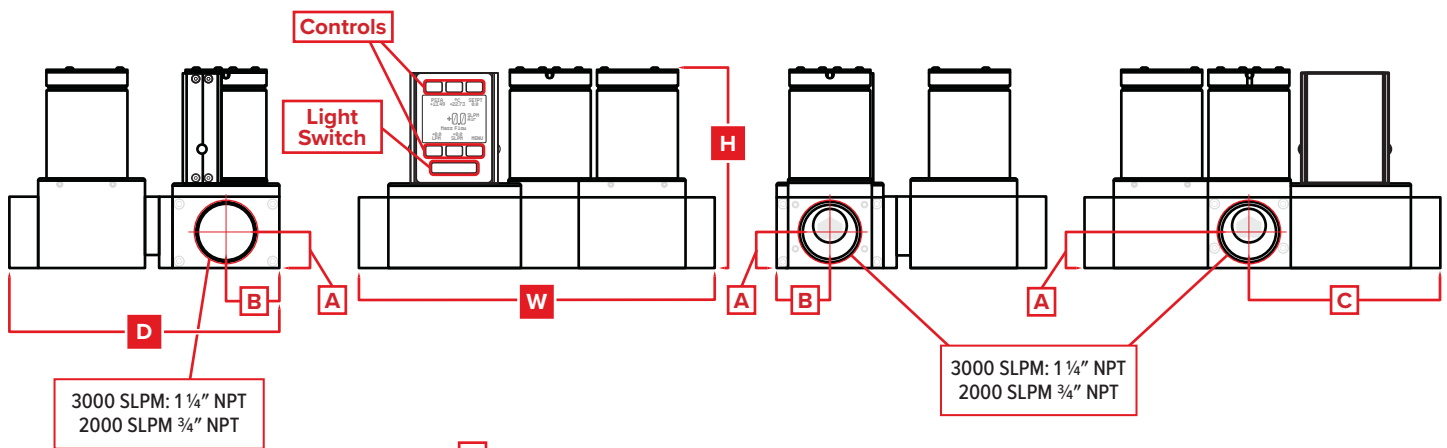
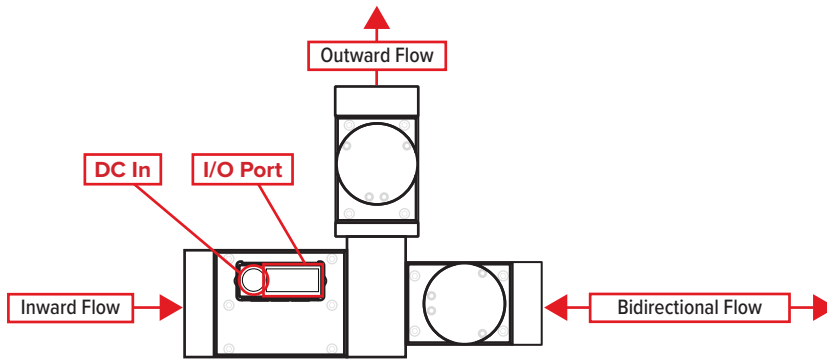
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DIMENSIONS																WEIGHT
Full scale flow	Type	Height	Width	Depth	A	B	C	E	F	G	I	J	K	M	N	
2000 SLPM	MCRD	5.495 in	8.900 in	6.550 in	1.120 in	1.450 in	5.200 in	0.200 in	2.500 in	0.700 in	1.500 in	3.850 in	1.350 in	4.450 in	6.200 in	≈ 20.8 lb
		139.57 mm	226.06 mm	166.37 mm	28.45 mm	36.83 mm	132.08 mm	5.08 mm	63.50 mm	17.78 mm	38.10 mm	97.79 mm	34.29 mm	113.03 mm	157.48 mm	≈ 9.4 kg
3000 SLPM	MCRD	5.495 in	9.725 in	7.350 in	0.960 in	1.450 in	5.225 in	0.200 in	2.500 in	0.700 in	1.500 in	3.850 in	1.375 in	4.475 in	6.225 in	≈ 20.8 lb
		139.57 mm	247.02 mm	186.69 mm	24.38 mm	36.83 mm	132.72 mm	5.08 mm	63.50 mm	17.78 mm	38.10 mm	97.79 mm	34.93 mm	113.67 mm	158.12 mm	≈ 9.4 kg