

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

**10 sccm** full scale through **20 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>	±0.6% of reading or ±0.1% of full scale, whichever is greater
High Accuracy Option <sup>1</sup>	±0.5% of reading or ±0.1% of full scale, whichever is greater
Repeatability (2σ)	±(0.1% 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 shift: ±0.01% of full scale per °C from tare temperature Mass flow span shift: ±0.01% of reading per °C from 25°C
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 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	302, 303, 304, 316L, and 430FR stainless steel; FKM, alumina ceramic, brass, glass, gold, heat-cured epoxy, heat-cured silicone rubber, polyamide, silicon

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>	12–24 VDC, 250 mA (290 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	Pressure drop at full scale flow <sup>3</sup>	Process connections <sup>4</sup>	Mount tap size
10 sccm	2.8 PSID	M5 female (10-32 compatible) <sup>5</sup>	2× 8-32 UNC 0.175 in [4.45 mm]
20–50 sccm	1.0 PSID	M5 female (10-32 compatible) <sup>5</sup>	2× 8-32 UNC 0.175 in [4.45 mm]
100–500 sccm	1.0 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 mm]
1 SLPM	1.5 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 mm]
2 SLPM	3.0 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 mm]
5 SLPM	2.0 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 mm]
10 SLPM	5.5 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 mm]
20 SLPM	20.0 PSID	1/8" NPT female	2× 8-32 UNC 0.350 in [8.89 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> Default connections shown. Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO®, and VCR®).

<sup>5</sup> Shipped with 1/8" female NPT face seal adapters.

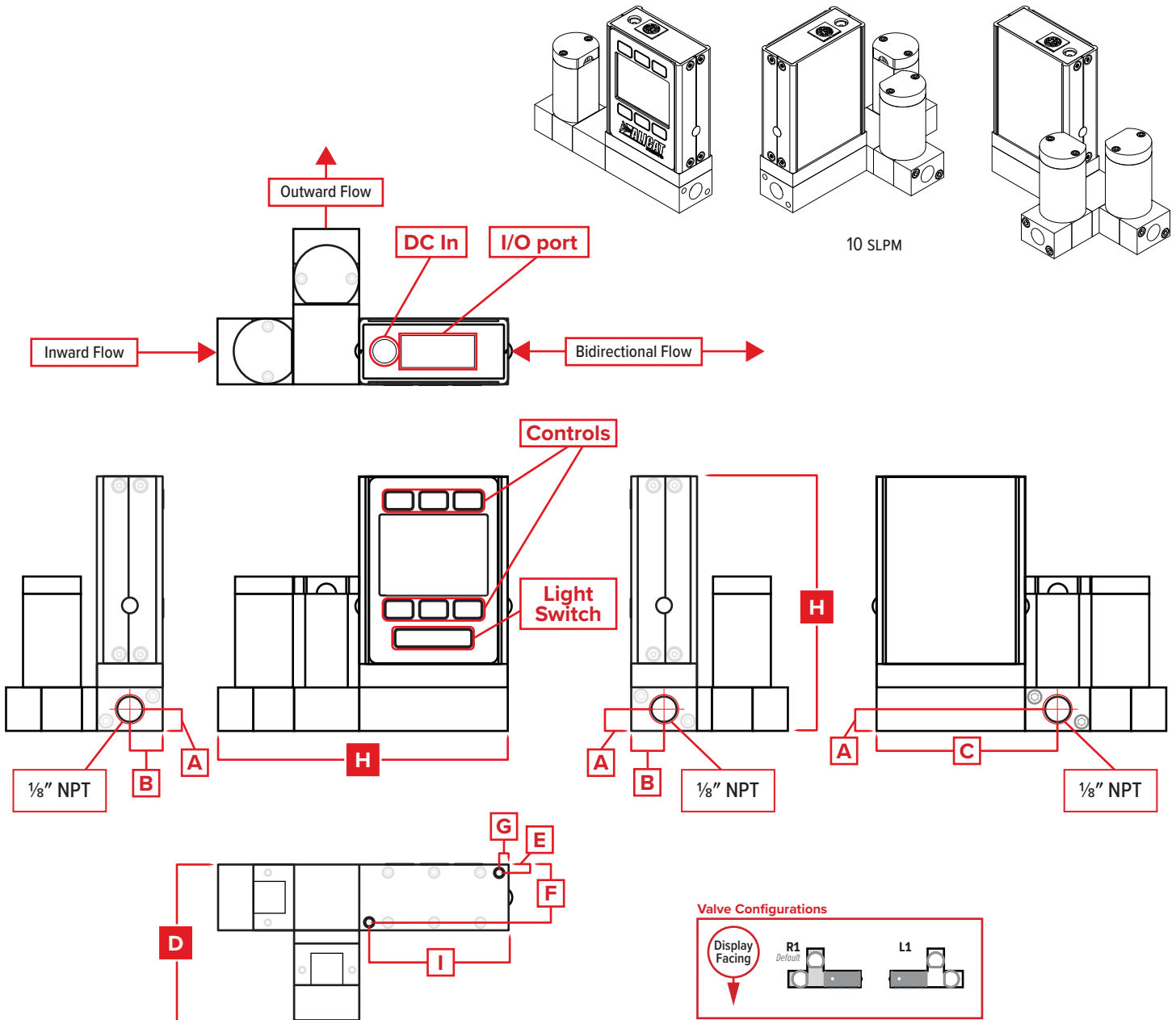
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DIMENSIONS											WEIGHT
Full scale flow	Height	Width	Depth	A	B	C	E	F	G	I	
100 sccm– 20 SLPM	4.067 in	4.638 in	2.486 in	0.350 in	0.525 in	2.900 in	0.125 in	0.925 in	0.150 in	2.225 in	≈ 1.8 lb
	103.30 mm	117.81 mm	63.14 mm	8.89 mm	13.34 mm	73.66 mm	3.18 mm	23.50 mm	3.81 mm	56.52 mm	≈ 0.8 kg