

Technical Data for **M-Series** Mass Flow Meters

0.5 SCCM full scale through 5 SCCM full scale

Standard specifications. Consult Alicat for available options.



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

SENSOR PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm(0.8\%$ of reading + 0.2% of full scale) High-accuracy option (5 SCCM models): $\pm(0.4\%$ of reading + 0.2% of full scale)
Repeatability (2 σ)	$\pm(0.2\%$ of reading + 0.02% of full scale)
Pressure accuracy ¹	Above 1 atm: $\pm 0.5\%$ of reading Below 1 atm: ± 0.07 PSIA
Flow measurement range	0.01 – 100% of full scale (10,000:1 turndown ratio)
Operating pressure	11.5 – 160 PSIA
Pressure sensitivity	Mass flow zero shift and span shift: $\pm(0.08\%$ of reading + 0.02% of full scale) per atmosphere from calibration conditions
Temperature sensitivity	Mass flow zero shift and span shift: 0.02% of full scale per °C from 25°C
Temperature accuracy	$\pm 0.75^\circ\text{C}$
Operating temperature range	–10 – 60°C (ambient and gas)
Totalizer volume uncertainty	$\pm 0.1\%$ of reading additional uncertainty
Sensor response time	<1 ms
Typical indication response time	<10 ms, flow rate dependent
Typical warm-up time	<1 s

MECHANICAL	
Process connections ²	M5 female (10-32 compatible), shipped with Buna-N O-ring face seal to 1/8" NPT female fittings
Wetted materials	302, 303, 304, and 316L stainless steel; FKM, alumina ceramic, glass, gold, heat-cured epoxy, heat-cured silicone rubber, 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	None
Mounting holes	2× 8-32 UNC threaded $\pm 0.175"$ [4.45 mm]

POWER AND COMMUNICATION	
Digital 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	40 Hz at 19200 baud
Analog output options ³	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, and pressure
Display update rate	10 Hz
Electrical connection options ³	6-pin locking, 8-pin mini-DIN, 8-pin M12, 9-pin DB-9, 15-pin DB-15 (contact Alicat for custom pinouts)
Power requirements	0 – 5 Vdc output: 9 – 24 Vdc, 40 mA 0 – 10 Vdc output: 12 – 28 Vdc, 40 mA 4 – 20 mA output: 12 – 28 Vdc, 40 mA

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

² Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO®, and VCR®).

³ Consult the individual operating bulletins for specific industrial protocol power requirements and data transmission specifications.

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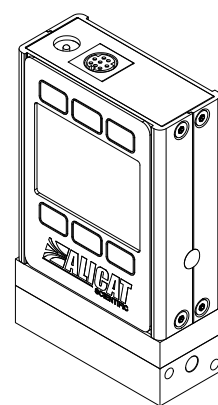
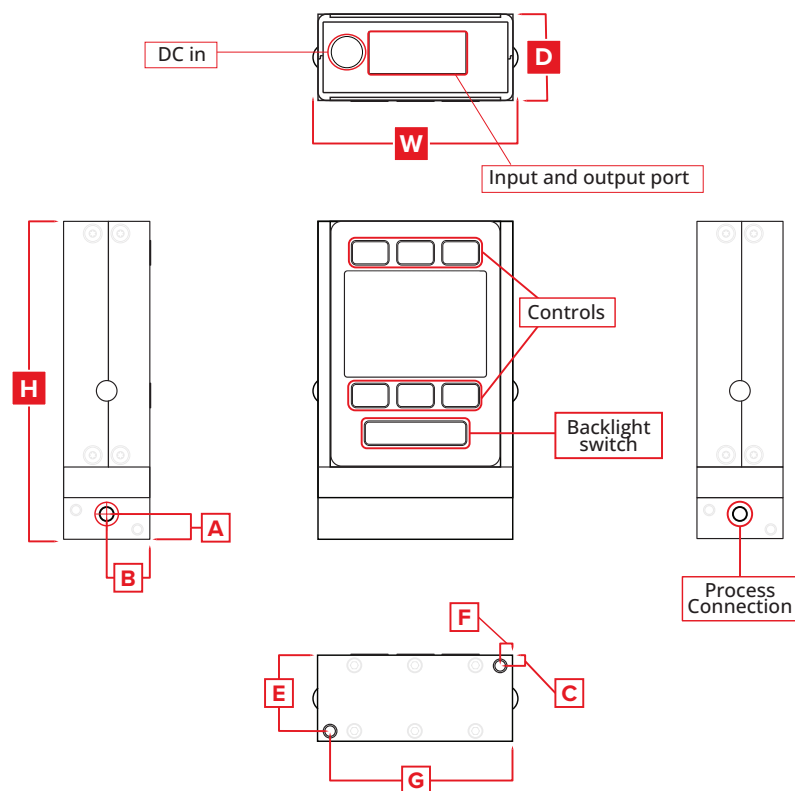
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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.

FLOW AND PROCESS DATA	
Full scale flow	Pressure drop at full scale flow venting to atmosphere ⁴
0.5 – 5 SCCM	1.0 PSID

PORTABLE DEVICES (MB SERIES)	
Power requirements	5 Vdc, 1 A recommended via an outlet adapter to USB
Battery life	Monochrome screen: 18 hours, user-configurable, contrast dependent Color TFT screen: 8 hours, user-configurable, contrast dependent
Electrical connections	Serial communication and power over Micro-USB Bluetooth® Low Energy (requires the Alicat Connect app and a compatible Android or iOS mobile device)
Charging temperature	0–45°C
Dimensions	Add 1.646" [41.81 mm] to height, and 0.2 lb. [90.72 g] to weight

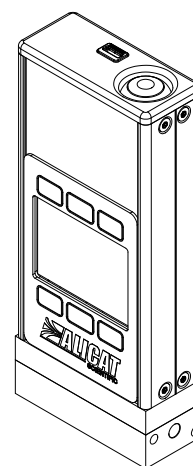
⁴ Lower pressure drops available, including the WHISPER™ series mass flow meters at alicat.com/mw.

Representative Examples



5 SCCM

MB-Series
0.5 SCCM



DIMENSIONS										WEIGHT
Full scale flow	Height	Width	Depth	A	B	C	E	F	G	
0.5–5 SCCM	3.90"	2.38"	1.05"	0.34"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 0.8 lb
	99.0 mm	60.3 mm	26.7 mm	8.5 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.4 kg

Technical Data for M-Series Mass Flow Meters

10 SCCM full scale through 20 SLPM full scale

Standard specifications. Consult Alicat for available options.



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SENSOR PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.6\%$ of reading or $\pm 0.1\%$ of full scale, whichever is greater High-accuracy option: $\pm 0.5\%$ of reading or $\pm 0.1\%$ of full scale, whichever is greater
Repeatability (2 σ)	$\pm (0.1\% \text{ of reading} + 0.02\% \text{ of full scale})$
Pressure accuracy ¹	Above 1 atm: $\pm 0.5\%$ of reading Below 1 atm: ± 0.07 PSIA
Flow measurement range	0.01 – 100% of full scale (10,000:1 turndown ratio)
Operating pressure	11.5 – 160 PSIA
Pressure sensitivity	Mass flow zero shift: $\pm 0.01\%$ of full scale per atm from tare pressure Mass flow span shift: $\pm 0.1\%$ of reading per atmosphere from calibration conditions
Temperature sensitivity	Mass flow zero shift: $\pm 0.01\%$ of full scale per $^{\circ}\text{C}$ from tare temperature Mass flow span shift: $\pm 0.01\%$ of reading per $^{\circ}\text{C}$ from 25°C
Temperature accuracy	$\pm 0.75^{\circ}\text{C}$
Operating temperature range	-10 – 60°C (ambient and gas)
Totalizer volume uncertainty	$\pm 0.1\%$ of reading additional uncertainty
Sensor response time	< 1 ms
Typical indication response time	< 10 ms, flow rate dependent
Typical warm-up time	< 1 s

MECHANICAL	
Process connections ²	10 – 50 SCCM: M5 female (10-32 compatible), shipped with Buna-N O-ring face seal to $\frac{1}{8}$ " NPT female fittings 100SCCM – 20 SLPM: $\frac{1}{8}$ " NPT female
Wetted materials	302, 303, 304, and 316L stainless steel; FKM, alumina ceramic, glass, gold, heat-cured epoxy, heat-cured silicone rubber, 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	None
Mounting holes	10 – 50 SCCM: $2 \times 8\text{-}32$ UNC threaded ∓ 0.175 " [4.45 mm] 100 SCCM – 20 SLPM: $2 \times 8\text{-}32$ UNC threaded ∓ 0.350 " [8.89 mm]

POWER AND COMMUNICATION	
Digital 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	40 Hz at 19200 baud
Analog output options ³	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, 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 (contact Alicat for custom pinouts)
Power requirements ³	0 – 5 Vdc output: 9 – 24 Vdc, 40 mA 0 – 10 Vdc output: 12 – 28 Vdc, 40 mA 4 – 20 mA output: 12 – 28 Vdc, 40 mA

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

² Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO®, and VCR®).

³ Consult the individual operating bulletins for specific industrial protocol power requirements and data transmission specifications.

Technical Data for M-Series Mass Flow Meters

10 SCCM full scale through 20 SLPM full scale

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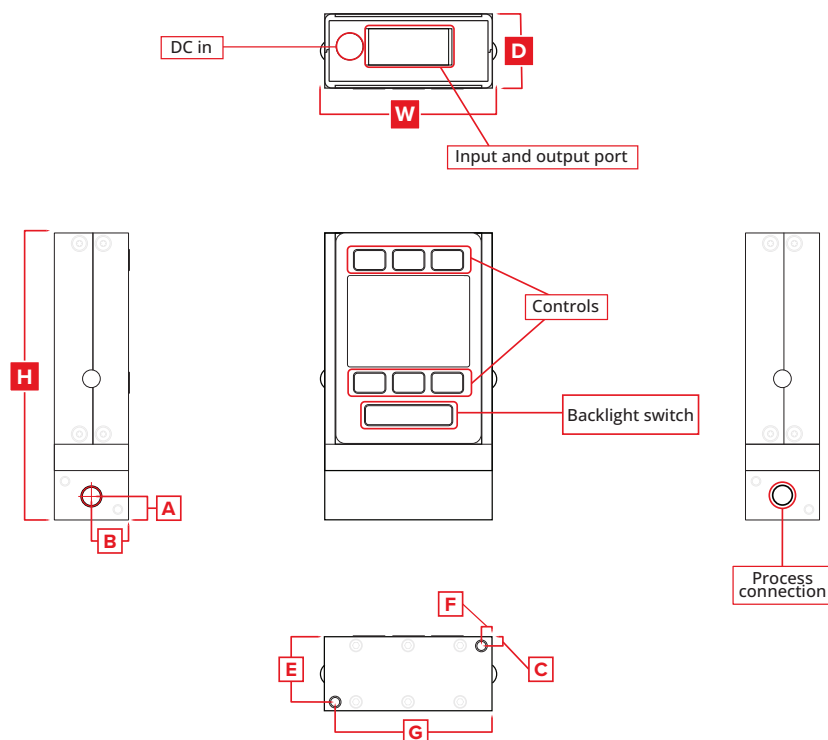
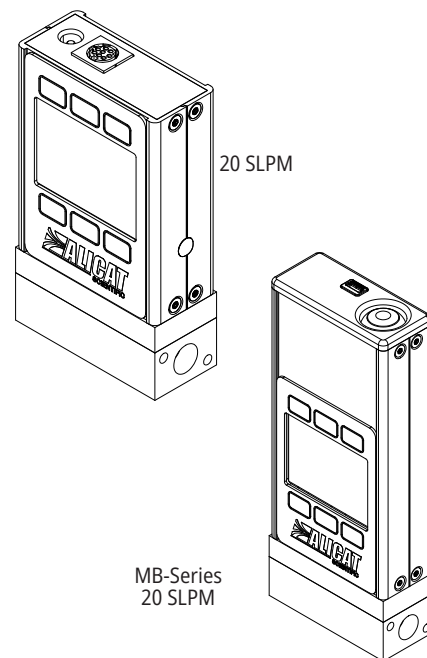
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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	Pressure drop at full scale flow venting to atmosphere ⁴
10 SCCM – 20 SLPM	1.0 PSID

PORTABLE DEVICES (MB SERIES)	
Power requirements	5 Vdc, 1 A recommended via an outlet adapter to USB
Battery life	Monochrome screen: 18 hours, user-configurable, contrast dependent Color TFT screen: 8 hours, user-configurable, contrast dependent
Electrical connection	Serial over Micro-USB Type B Bluetooth® Low Energy (requires the Alicat Connect app and a compatible Android or iOS mobile device)
Charging temperature	0–45°C
Dimensions	Add 1.646" [41.81 mm] to height, and 0.2 lb. [90.72 g] to weight

⁴ Lower pressure drops available, including the WHISPER™ series mass meters at alicat.com/mw.

Representative Examples



DIMENSIONS										WEIGHT
Full scale flow	Height	Width	Depth	A	B	C	E	F	G	
10–50 SCCM	3.90"	2.38"	1.05"	0.34"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 0.8 lb
	99.0 mm	60.3 mm	26.7 mm	8.5 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.4 kg
100 SCCM–20 SLPM	4.07"	2.38"	1.05"	0.35"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.0 lb
	103.3 mm	60.3 mm	26.7 mm	8.9 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.5 kg

Technical Data for M/MB-Series Mass Flow Meters

50 SLPM full scale through 10,000 SLPM full scale

Meters for flow rates over 6000 SLPM are compatible with hydrogen only.

Standard specifications. Consult Alicat for available options.



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SENSOR PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.8\%$ of reading and $\pm 0.2\%$ of full scale High-accuracy option (≤ 500 SLPM 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
Flow measurement range	0.01 – 100% of full scale (10,000:1 turndown ratio)
Operating pressure range	11.5 – 160 PSIA
Pressure sensitivity	Mass flow zero shift and span shift: $\pm (0.08\%$ of reading and $\pm 0.02\%$ of full scale) per atmosphere from calibration conditions
Temperature sensitivity	Mass flow zero shift 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	$-10 - 60^{\circ}\text{C}$ (ambient and gas)
Totalizer volume uncertainty	$\pm 0.1\%$ 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

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

MECHANICAL	
Wetted materials	302, 303, 304, and 316L stainless steel; FKM, alumina ceramic, glass, gold, heat-cured epoxy, heat-cured silicone rubber, polyamide, silicon
Maximum pressure	Damage possible above 200 PSIA common mode pressure. Damage possible by rapid pressure change above 75 PSI differential.
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting holes	50 – 100 SLPM: $4 \times 8\text{-}32$ UNC threaded $\downarrow 0.375"$ [9.53 mm] 250 – 1000 SLPM: $4 \times 8\text{-}32$ UNC threaded $\downarrow 0.328"$ [8.33 mm] 2000 – 3000 SLPM: $4 \times 8\text{-}32$ UNC threaded $\downarrow 0.330"$ [8.38 mm] 5000 – 10,000 SLPM: $4 \times 8\text{-}32$ UNC threaded $\downarrow 0.300"$ [7.62 mm]

POWER AND COMMUNICATION	
Digital output options ²	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 ³	40 Hz at 19200 baud
Analog 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, and pressure
Display update rate	10 Hz
Electrical connection options ²	6-pin locking, 8-pin mini-DIN, 8-pin M12, 9-pin DB-9, 15-pin DB-15 (contact Alicat for custom pinouts)
Power requirements ^{2,3}	0 – 5 Vdc output: 9 – 24 Vdc, 40 mA 0 – 10 Vdc output: 12 – 28 Vdc, 40 mA 4 – 20 mA output: 12 – 28 Vdc, 80 mA

² See Portable Devices table for MB-Series specifications and options.

³ Consult the individual operating bulletins for specific industrial protocol power requirements and data transmission specifications.

Technical Data for M/MB-Series Mass Flow Meters

50 SLPM full scale through 10,000 SLPM full scale

Meters for flow rates over 6000 SLPM are compatible with hydrogen only.

Standard specifications. Consult Alicat for available options.



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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™ 4	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™ 4	20 user-definable gas mixes. Each mix may have up to 5 gases with 0.01% composition resolution.

4 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	Pressure drop at full scale flow when venting air to atmosphere ⁵	Default process connection ⁶
50 SLPM	2.0 PSID	¼" NPT female
100 SLPM	2.5 PSID	¼" NPT female
250 SLPM	2.1 PSID	½" NPT female
500 SLPM	4.0 PSID	¾" NPT female
1000 SLPM	6.0 PSID	¾" NPT female
2000 SLPM	5.0 PSID	¾" NPT female
3000 SLPM	7.1 PSID	1¼" NPT female
5000 SLPM	3.4 PSID	1½" NPT female
10,000 SLPM (H ₂ only)	3.5 PSID ⁷	1½" NPT female

5 Lower pressure drops and other valves available, including our WHISPER™ series mass flow meters at alicat.com/mw.

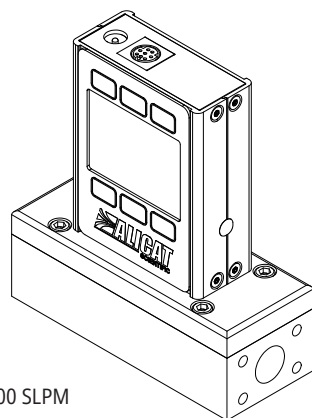
6 Consult Alicat for available process connection options, such as: Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO®, and VCR®).

7 Pressure drop of 3.5 PSID is at full scale when venting hydrogen to atmosphere.

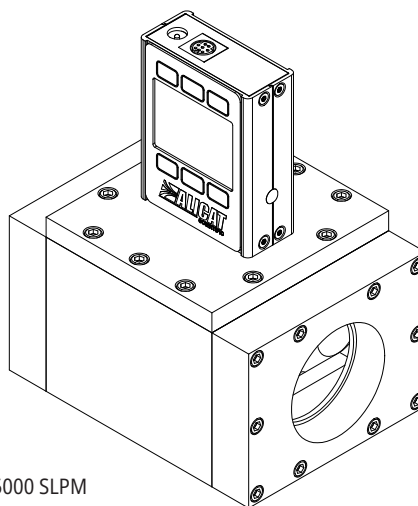
PORTABLE DEVICES (MB-SERIES) ⁸	
Power requirements	5 Vdc, 1 A recommended via an outlet adapter to USB
Battery life	Monochrome screen: 18 hours, user-configurable, contrast dependent Color TFT screen: 8 hours, user-configurable, contrast dependent
Electrical connection	Serial over Micro-USB Type B Bluetooth® Low Energy (requires the Alicat Connect app and a compatible Android or iOS mobile device)
Charging temperature	0 – 45°C
Dimensions	Add 1.646" [41.81 mm] to height, and 0.2 lb [90.72 g] to weight

8 More information about our MB-Series portable mass flow meters at alicat.com/mb.

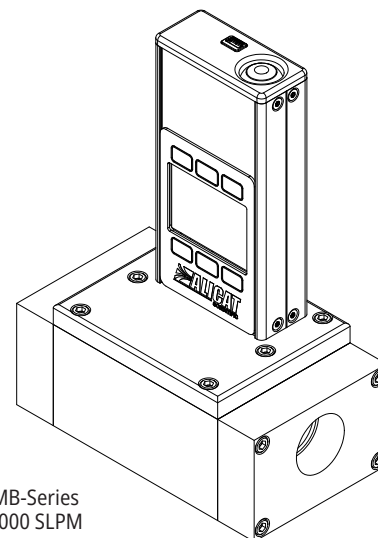
Representative Examples



100 SLPM



5000 SLPM



MB-Series
2000 SLPM

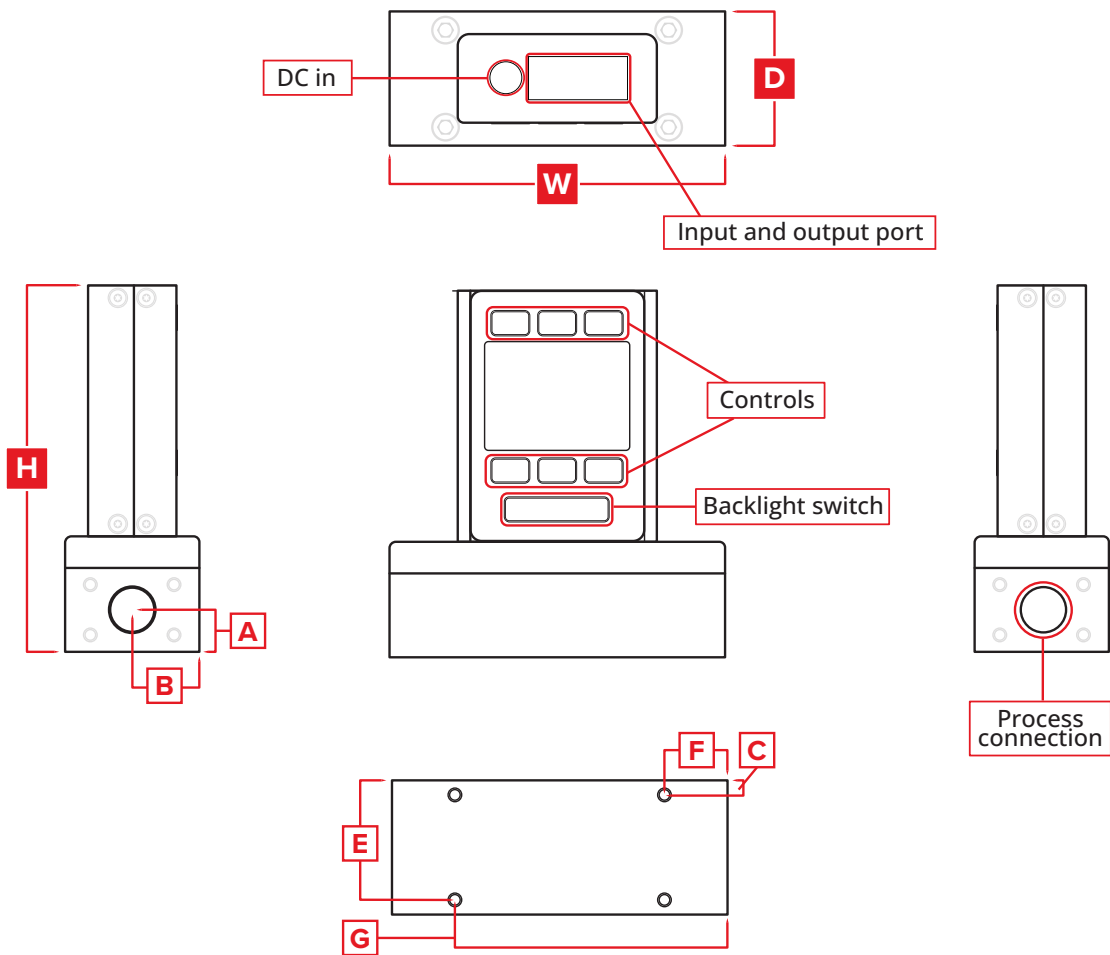
Technical Data for **M/MB-Series** Mass Flow Meters

50 SLPM full scale through 10,000 SLPM full scale

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



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DIMENSIONS ⁹										WEIGHT
Full scale flow	Width	Depth	Height	A	B	C	E	F	G	
50 – 100 SLPM	4.00"	1.60"	4.37"	0.50"	0.80"	0.18"	1.43"	0.75"	3.25"	≈ 2.4 lb
	101.6 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	≈ 1.1 kg
250 SLPM	4.00"	1.60"	4.97"	0.80"	0.80"	0.18"	1.43"	0.75"	3.25"	≈ 2.4 lb
	101.6 mm	40.6 mm	126.2 mm	20.3 mm	20.3 mm	4.4 mm	36.2 mm	19.1 mm	82.6 mm	≈ 1.1 kg
500 – 1000 SLPM	4.00"	1.60"	4.97"	0.80"	0.80"	0.18"	1.43"	0.75"	3.25"	≈ 3.5 lb
	101.6 mm	40.6 mm	126.2 mm	20.3 mm	20.3 mm	4.4 mm	36.2 mm	19.1 mm	82.6 mm	≈ 1.6 kg
2000 SLPM	5.20"	2.90"	5.29"	1.12"	1.45"	0.20"	2.70"	1.35"	3.85"	≈ 4.5 lb
	132.1 mm	73.7 mm	134.3 mm	28.4 mm	36.8 mm	5.1 mm	68.6 mm	34.3 mm	97.8 mm	≈ 2.0 kg
3000 SLPM	5.20"	2.90"	5.29"	0.96"	1.45"	0.20"	2.70"	1.35"	3.85"	≈ 4.5 lb
	132.1 mm	73.7 mm	134.3 mm	24.4 mm	36.8 mm	5.1 mm	68.6 mm	34.3 mm	97.8 mm	≈ 2.0 kg
5000 SLPM	5.20"	3.84"	6.27"	1.45"	1.92"	0.30"	3.55"	1.35"	3.85"	≈ 14.0 lb
	132.1 mm	97.5 mm	159.2 mm	36.8 mm	48.8 mm	7.5 mm	90.0 mm	34.3 mm	97.8 mm	≈ 6.4 kg
10,000 SLPM (H ₂ only)	5.20"	3.84"	6.27"	1.45"	1.92"	0.30"	3.55"	1.35"	3.85"	≈ 14.0 lb
	132.1 mm	97.5 mm	159.2 mm	36.8 mm	48.8 mm	7.5 mm	90.0 mm	34.3 mm	97.8 mm	≈ 6.4 kg

⁹ Portable devices (MB Series) add 1.646" [41.81 mm] to height, and 0.2 lb. [90.72 g] to weight.