

Technical Data for **Whisper** Series Mass Flow Controllers

0.5 sccm full scale through 5 sccm full scale

Standard specifications. Consult Alicat for available options.

SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.8\%$ of reading and $\pm 0.2\%$ of full scale High accuracy (≥ 5 SCCM models): $\pm 0.4\%$ of reading and $\pm 0.2\%$ of full scale
Flow repeatability (2 σ)	$\pm (0.2\% \text{ of reading} + 0.02\% \text{ of full scale})$
Pressure accuracy ¹	Above 1 atm: $\pm 0.75\%$ of reading Below 1 atm: ± 0.1 PSIA
Steady state control range	0.5 – 100% of full scale (200:1 turndown ratio)
Operating pressure range	11.5 – 60 PSIA
Pressure sensitivity	Mass flow zero shift and span shift: $\pm (0.08\% \text{ of reading} + 0.02\% \text{ of full scale})$ per atmosphere from tare pressure
Temperature sensitivity	Mass flow zero shift and span shift: 0.03% 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)
Valve function	Normally closed
Totalizer volume uncertainty	$\pm 0.1\%$ of reading additional uncertainty
Sensor response time	< 1 ms
Typical control response time	30 ms to 63% of step change (T63), user-adjustable
Typical indication response time	As fast as 100 ms (T63), flow rate dependent, user-adjustable
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, 316L and 430FR stainless steel; FKM, alumina ceramic, glass, glass-reinforced polyphenylene sulfide, gold, heat-cured epoxy, heat-cured silicone rubber, silicon, brass
Maximum pressure	Damage possible above 80 PSIA common mode pressure. Damage possible above 15 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 $\downarrow 0.175"$ [4.45mm]

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	24 Vdc, 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.

Technical Data for **Whisper** Series Mass Flow Controllers

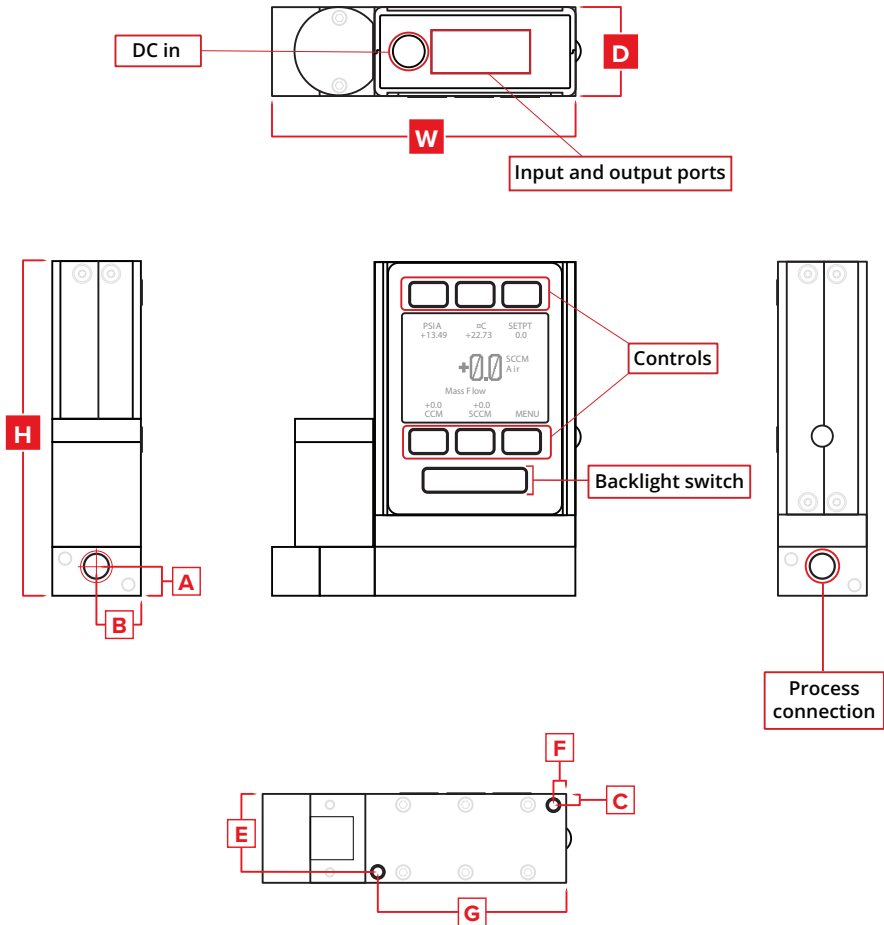
0.5 sccm full scale through 5 sccm full scale

Standard specifications. Consult Alicat for available options.

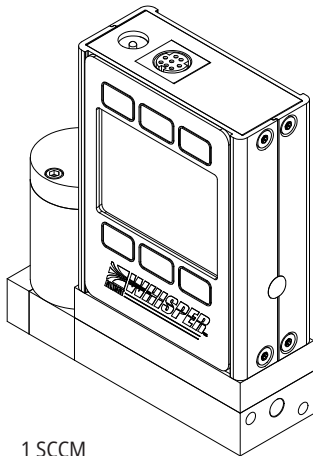
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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 air to atmosphere	Default process connection ³
0.5 – 5 sccm	0.07 PSID	M5 female thread (10-32 compatible)

³ 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 Example



DIMENSIONS										WEIGHT
Full scale flow	Width	Depth	Height	A	B	C	E	F	G	
0.5 – 5 sccm	3.34"	1.05"	3.90"	0.34"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.1 lb
	84.8 mm	26.7 mm	99.0 mm	8.5 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.5 kg

Technical Data for **Whisper** Mass Flow Controllers

10 sccm full scale through **100 SLPM** full scale

Standard specifications. Consult Alicat for available options.



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SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.75\%$ of reading or $\pm 0.1\%$ of full scale, whichever is greater High accuracy: $\pm 0.6\%$ of reading or $\pm 0.1\%$ of full scale, whichever is greater
Flow repeatability (2σ)	$\pm (0.2\% \text{ of reading} + 0.02\% \text{ of full scale})$
Pressure accuracy ¹	Above 1 atm: $\pm 0.75\%$ of reading Below 1 atm: ± 0.1 PSIA
Steady state control range	0.5 – 100% of full scale (200:1 turndown ratio)
Operating pressure range	11.5 – 60 PSIA
Pressure sensitivity	Mass flow zero shift: $\pm 0.01\%$ of full scale per atmosphere from tare pressure Mass flow span shift: $\pm 0.1\%$ of reading per atmosphere from calibration conditions
Temperature sensitivity	Mass flow zero shift: $\pm 0.03\%$ of full scale per °C from tare temperature Mass flow span shift: $\pm 0.01\%$ of reading per °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 additional uncertainty
Sensor response time	< 1 ms
Typical control response time	MCW: 30 ms to 63% of step change (T63), user-adjustable MCRW: 150 ms to 63% of step change (T63), user-adjustable
Typical indication response time	As fast as 100 ms (T63), flow rate dependent, user-adjustable
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, glass-reinforced polyphenylene sulfide, gold, heat-cured epoxy, heat-cured silicone rubber, silicon MCW: Add 430FR stainless steel and brass MCRW: Add 410 stainless steel, Delrin®, and nylon
Maximum pressure	Damage possible above 80 PSIA common mode pressure Damage possible above 15 PSI differential pressure
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting orientation sensitivity	MCW-Series: None MCRW-Series: Rolamite valves must be upright
Mounting holes	10 – 20 sccm: 2× 8-32 UNC threaded $\mp 0.175"$ [4.45mm] 50 sccm – 20 SLPM: 2× 8-32 UNC threaded $\mp 0.300"$ [7.62mm] 5 – 20 SLPM: 4× 8-32 UNC threaded $\mp 0.375"$ [9.53 mm] 40 – 100 SLPM: 4× 8-32 UNC threaded $\mp 0.328"$ [8.33 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	MCW: 12 – 24 Vdc, 250 mA MCRW: 24 Vdc, 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.

Technical Data for **Whisper** Mass Flow Controllers

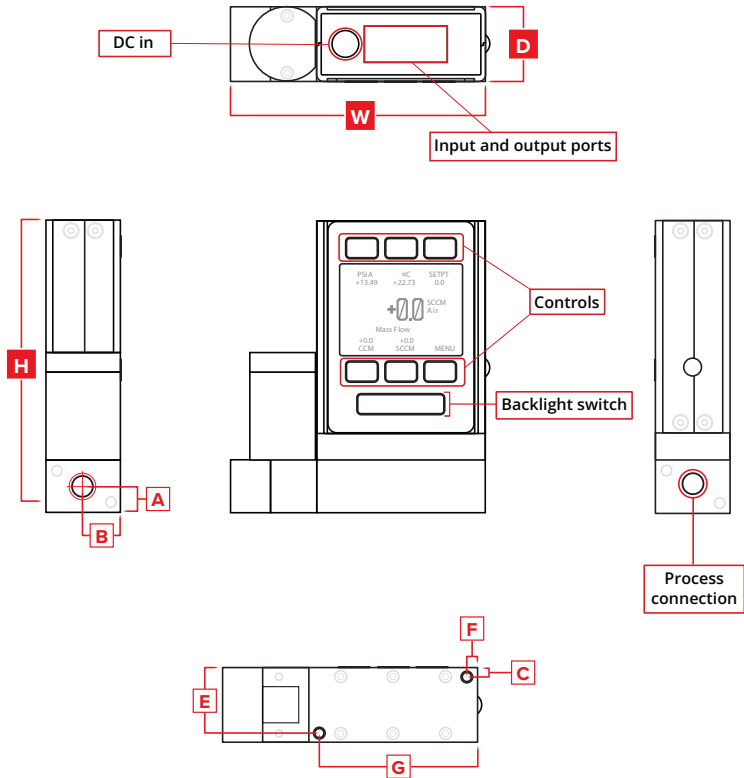
10 sccm full scale through **100 SLPM** full scale

Standard specifications. Consult Alicat for available options.

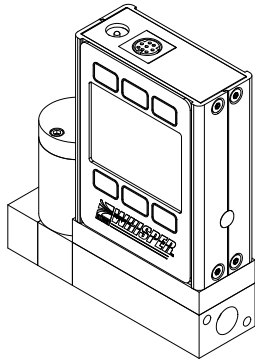
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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 SPECIFICATIONS			
Full scale flow	Type	Pressure drop at full scale flow venting to atmosphere	Default process connections ³
10–20 sccm	MCW	0.07 PSID	M5 female thread (10-32 compatible) ⁵
50–500 sccm	MCW	0.07 PSID	1⁄8" NPT Female
1 SLPM	MCW	0.10 PSID	1⁄8" NPT Female
2 SLPM	MCW	0.18 PSID	1⁄8" NPT Female
5 SLPM	MCRW	0.10 PSID	1⁄4" NPT Female
10 SLPM	MCRW	0.12 PSID	1⁄4" NPT Female
20 SLPM	MCRW	0.26 PSID	1⁄4" NPT Female
40 SLPM	MCRW	0.14 PSID	1⁄2" NPT Female
50 SLPM	MCRW	0.17 PSID	3⁄4" NPT Female
100 SLPM	MCRW	0.30 PSID	3⁄4" NPT Female

3 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



2 SLPM

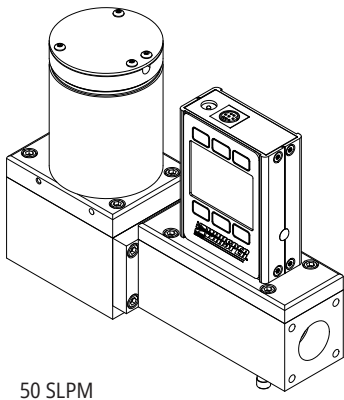
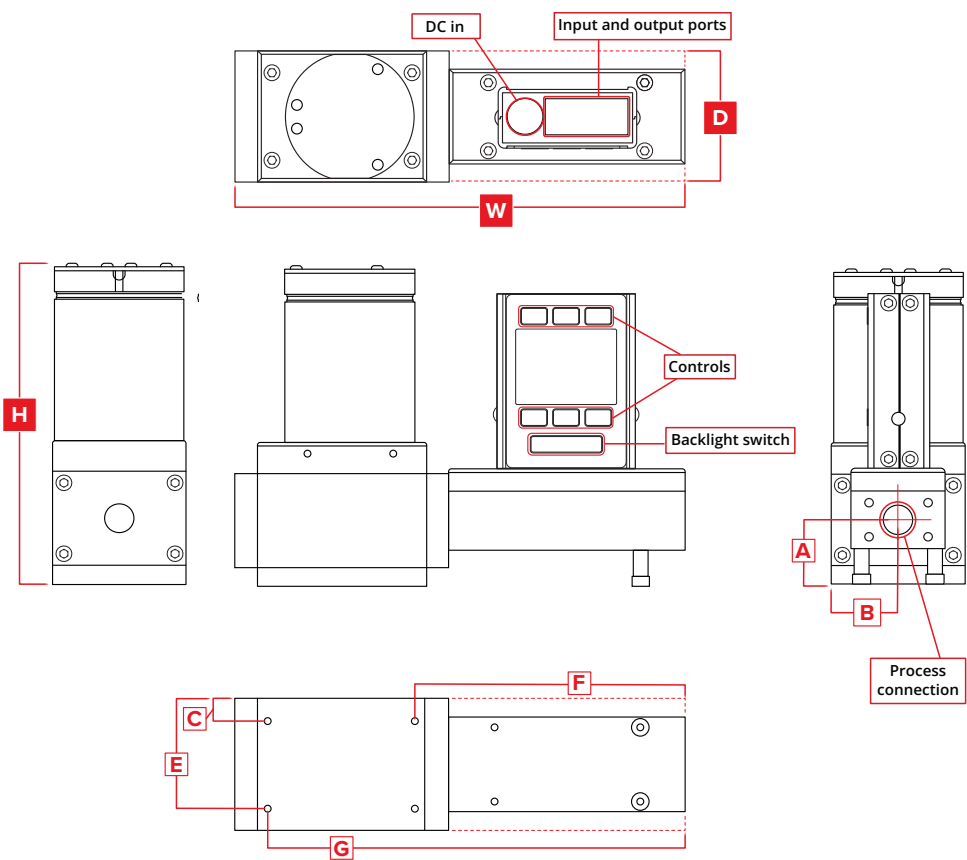
DIMENSIONS											WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	
10 – 20 sccm	MCW	3.34"	1.05"	3.90"	0.34"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.1 lb
		84.8 mm	26.7 mm	99.0 mm	8.5 mm	13.3 mm	3.2 mm	23.5 mm	3.8 mm	56.5 mm	≈ 0.5 kg
50 sccm – 2 SLPM	MCW	3.59"	1.05"	4.07"	0.35"	0.53"	0.13"	0.93"	0.15"	2.23"	≈ 1.2 lb
		91.1 mm	26.7 mm	103.3 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 **Whisper** Mass Flow Controllers

10 sccm full scale through **100 SLPM** full scale

Standard specifications. Consult Alicat for available options.

Representative Examples



50 SLPM

DIMENSIONS											WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	
5 SLPM	MCRW	7.65"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	≈ 9.0 lb
		194.3 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	≈ 4.1 kg
10 SLPM	MCRW	7.65"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	≈ 9.0 lb
		194.3 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	≈ 4.1 kg
20 SLPM	MCRW	7.65"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	≈ 9.0 lb
		194.3 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	≈ 4.1 kg
40 SLPM	MCRW	7.65"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	≈ 9.0 lb
		194.3 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	≈ 4.1 kg
50 SLPM – 100 SLPM	MCRW	7.28"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	≈ 9.0 lb
		184.8 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	≈ 4.1 kg

Technical Data for **Whisper** Series Mass Flow Controllers

250 SLPM full scale through **1000 SLPM** full scale

Standard specifications. Consult Alicat for available options.



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SENSOR AND CONTROL PERFORMANCE	
Mass flow accuracy ¹	Standard accuracy: $\pm 0.8\%$ of reading and $+ 0.2\%$ of full scale High accuracy (≤ 1000 SLPM models): $\pm 0.4\%$ of reading and $\pm 0.2\%$ of full scale
Flow repeatability (2σ)	$\pm (0.2\% \text{ of reading} + 0.02\% \text{ of full scale})$
Pressure accuracy ¹	Above 1 atm: $\pm 0.75\%$ of reading Below 1 atm: ± 0.1 PSIA
Steady state control range	0.5 – 100% of full scale (200:1 turndown ratio)
Operating pressure range	11.5 – 60 PSIA
Pressure sensitivity	Mass flow zero shift and span shift: $\pm 0.08\%$ of reading + 0.02% of full scale per atmosphere from tare pressure
Temperature sensitivity	Mass flow zero shift and span shift: 0.03% of full scale per °C from 25°C
Temperature accuracy	$\pm 0.75^\circ\text{C}$
Operating temperature range	$-10 - 60^\circ\text{C}$ (ambient and gas)
Valve function	Normally closed
Totalizer volume uncertainty	$\pm 0.1\%$ of reading additional uncertainty
Sensor response time	< 1 ms
Typical control response time	150 ms to 63% of step change (T63), user-adjustable
Typical indication response time	As fast as 100 ms (T63), flow rate dependent, user-adjustable
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, glass-reinforced polyphenylene sulfide, gold, heat-cured epoxy, heat-cured silicone rubber, silicon MCW: Add 430FR stainless steel and brass MCRW: Add 410 stainless steel, Delrin®, and nylon
Maximum pressure	Damage possible above 80 PSIA common mode pressure Damage possible above 15 PSI differential pressure
Relative humidity range	0 – 95%, non-condensing
Ingress protection	IP40 (consult Alicat for weatherproofing options)
Mounting orientation sensitivity	MCW-Series: None MCRW- and MCRHW-Series: Rolamite valves must be upright
Mounting holes	250 – 500 SLPM: 4× 8-32 UNC threaded $\nabla 0.328''$ [8.33 mm] 1000 SLPM: 4× 8-32 UNC threaded $\nabla 0.300''$ [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®, 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	MCRW: 24 Vdc, 1 A MCRWH: 24 – 30 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.

Technical Data for **Whisper** Series Mass Flow Controllers

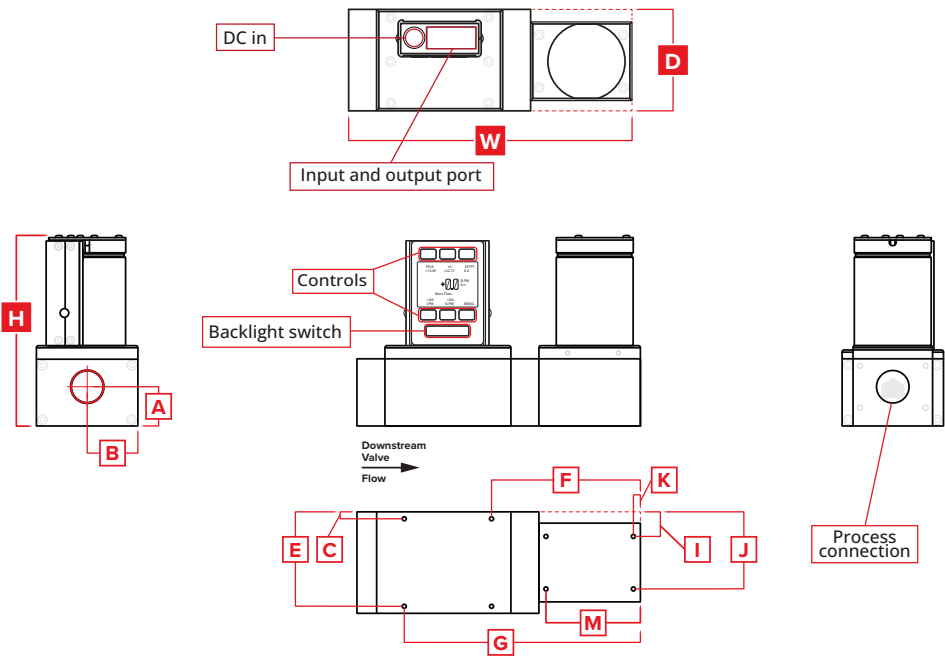
250 SLPM full scale through 1000 SLPM full scale

Standard specifications. Consult Alicat for available options.

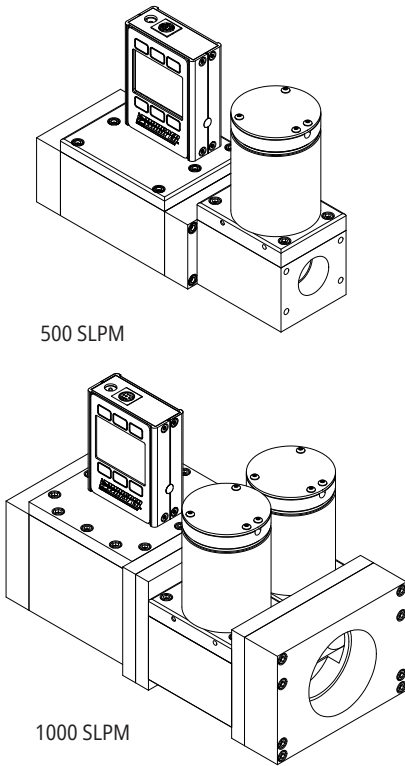
FEATURES	
STP reference conditions	25°C and 1 atm (default), user-configurable
NTP reference conditions	0°C and 1 atm (default), user-configurable
Gas Select™	98 user-selectable gases stored internally. Each gas optimized to match NIST's REFPROP 10 gas property calculations across the operating temperature 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 flow venting air to atmosphere	Default process connections ³
250 – 500 SLPM	MCRW	0.69 PSID	¾" NPT Female
1000 SLPM	MCRWH	1.65 PSID	2" NPT Female

³ 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



DIMENSIONS														WEIGHT
Full scale flow	Type	Width	Depth	Height	A	B	C	E	F	G	I	J	K	M
250 SLPM	MCRW	7.28"	2.25"	5.50"	1.12"	1.13"	0.38"	1.88"	4.58"	7.08"	—	—	—	—
		184.8 mm	57.2 mm	139.6 mm	28.4 mm	28.6 mm	9.5 mm	47.6 mm	116.2 mm	179.7 mm	—	—	—	—
500 SLPM	MCRW	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"
		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
1000 SLPM	MCRWH	9.80"	4.50"	6.27"	1.45"	2.25"	0.63"	3.88"	5.95"	8.45"	—	—	—	—
		248.9 mm	114.3 mm	159.2 mm	36.8 mm	57.2 mm	15.9 mm	98.4 mm	151.1 mm	214.6 mm	—	—	—	—