

# Technical Data for **Whisper Series** Mass Flow Meters

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

Standard specifications. Consult Alicat for available options.

SENSOR PERFORMANCE	
Mass Flow Accuracy at calibration conditions <sup>1</sup>	±0.75% of reading or ±0.1% of full scale, whichever is greater
High Accuracy Option <sup>1</sup>	±0.6% of reading or ±0.1% of full scale, whichever is greater
Bidirectional Option <sup>1</sup>	No additional uncertainties
Repeatability (2σ)	±(0.1% of reading + 0.02% of full scale)
Flow Measurement Range	0.01–100% of full scale
Temperature Sensitivity	Mass flow zero shift: ±0.03% 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 atmosphere from calibration conditions
Operating Temperature Range	-10–60°C (expanded range available)
Temperature Accuracy	±0.75°C
Operating Pressure Full Scale	60 PSIA (additional options available)
Pressure Accuracy above 1 ATM	±0.75% of reading
Pressure Accuracy below 1 ATM	±0.1 PSIA
Totalizer Volume Uncertainty	±0.5% of reading additional uncertainty
Sensor Response Time	<1 ms
Typical Indication Response Time <sup>2</sup>	127 ms (user adjustable)
Typical Warm-Up Time	<1 s

**1** Stated accuracy is after tare under equilibrium conditions.

Extreme gas behavior (especially near state boundaries) can introduce additional flow uncertainties.

**2** Indication response time includes user-adjustable averaging up to 255 ms.

MECHANICAL	
Minimum Operating Pressure	11.5 PSIA common mode pressure (lower operating pressures available) Differential pressure must exceed model pressure drop, see below for details
Maximum Operating Pressure	Damage possible above 80 PSIA common mode pressure Damage possible above 10 PSID differential pressure
Ingress Protection	IP40 (consult Alicat for weatherproofing options)
Humidity Range	0–95%, non-condensing
Wetted Materials	302 / 303 stainless steel, Viton®, glass-reinforced polyphenylene sulfide, alumina, glass, gold, silicon, heat-cured epoxy, heat-cured silicone rubber

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>3</sup>	9–24 VDC, 40 mA (12–24 VDC, 80 mA if equipped with 4–20 mA or 0–10 VDC output)
Digital Data Update Rate <sup>3</sup>	40 Hz at 19200 baud
Analog Data Update Rate	1 kHz
Display Update Rate	10 Hz
Analog Signal Accuracy	±0.1% of full scale additional uncertainty

**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
Monochrome LCD or Color TFT Display with integrated touchpad	Simultaneously displays mass flow, volumetric flow, temperature, 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% precision.

RANGE SPECIFIC SPECIFICATIONS			
Full scale flow	Pressure drop at full scale flow venting to atmosphere	Process connections <sup>4</sup>	Mount tap size
10–20 sccm	0.07 PSID	M5 female thread (10-32 compatible) <sup>5</sup>	2× 8-32 UNC 0.175 in [4.45 mm]
50 sccm–5 SLPM	0.07 PSID	1/8" NPT Female	2× 8-32 UNC 0.300 in [7.62 mm]
10 SLPM	0.08 PSID	1/4" NPT Female	2× 8-32 UNC 0.350 in [8.89 mm]
20 SLPM	0.25 PSID	1/4" NPT Female	4× 8-32 UNC 0.375 in [9.53 mm]
40 SLPM	0.12 PSID	1/2" NPT Female	4× 8-32 UNC 0.375 in [9.53 mm]
50 SLPM	0.14 PSID	3/4" NPT Female	4× 8-32 UNC 0.375 in [9.53 mm]
100 SLPM	0.24 PSID	3/4" NPT Female	4× 8-32 UNC 0.375 in [9.53 mm]

<sup>4</sup> Consult Alicat for available process connection options, such as:

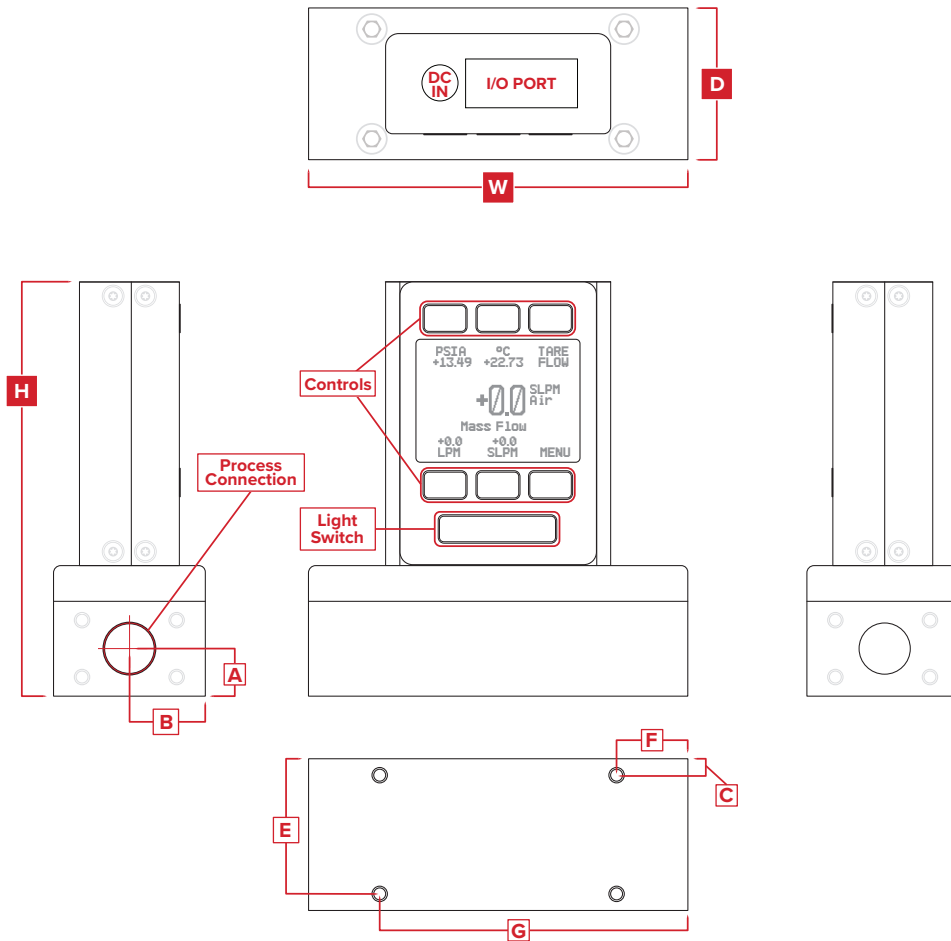
Compression, face seal, push-to-connect, BSPP, SAE, or Swagelok® (including tube, VCO, and VCR).

<sup>5</sup> Shipped with Buna-N O-Ring face seal to 1/8" female NPT fittings.

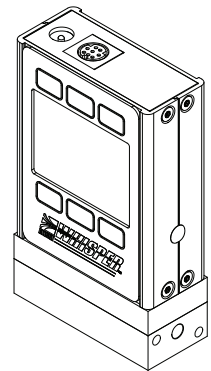
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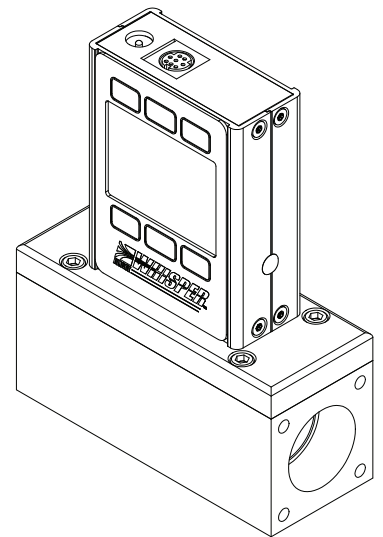
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## Representative Examples



10 SCCM



50 SLPM

### DIMENSIONS

Full scale flow	Weight	Height	Width	Depth	A	B	C	E	F	G
10–20 SCCM	≈ 0.8 lb	3.897 in	2.375 in	1.050 in	0.336 in	0.525 in	0.125 in	0.925 in	0.150 in	2.225 in
	≈ 0.4 kg	98.98 mm	60.33 mm	26.67 mm	8.53 mm	13.34 mm	3.18 mm	23.50 mm	3.81 mm	56.52 mm
50 SCCM–2 SLPM	≈ 1.0 lb	4.067 in	2.375 in	1.050 in	0.350 in	0.525 in	0.125 in	0.925 in	0.150 in	2.225 in
	≈ 0.5 kg	103.30 mm	60.33 mm	26.67 mm	8.89 mm	13.34 mm	3.18 mm	23.50 mm	3.81 mm	56.52 mm
5 SLPM	≈ 1.4 lb	4.167 in	2.375 in	1.050 in	0.350 in	0.525 in	0.125 in	0.925 in	0.150 in	2.225 in
	≈ 0.6 kg	105.84 mm	60.33 mm	26.67 mm	8.89 mm	13.34 mm	3.18 mm	23.50 mm	3.81 mm	56.52 mm
10 SLPM	≈ 2.4 lb	4.207 in	2.625 in	1.050 in	0.358 in	0.525 in	0.125 in	0.925 in	0.275 in	2.350 in
	≈ 1.1 kg	106.86 mm	66.68 mm	26.67 mm	9.09 mm	13.34 mm	3.18 mm	23.50 mm	6.99 mm	59.69 mm
20 SLPM	≈ 2.4 lb	4.367 in	4.000 in	1.600 in	0.500 in	0.800 in	0.175 in	1.425 in	0.750 in	3.250 in
	≈ 1.1 kg	110.92 mm	101.60 mm	40.64 mm	12.70 mm	20.32 mm	4.45 mm	36.20 mm	19.05 mm	82.55 mm
40–100 SLPM	≈ 3.5 lb	4.967 in	4.000 in	1.600 in	0.800 in	0.800 in	0.175 in	1.425 in	0.750 in	3.250 in
	≈ 1.5 kg	126.16 mm	101.60 mm	40.64 mm	20.32 mm	20.32 mm	4.45 mm	36.20 mm	19.05 mm	82.55 mm