

# Technical Data for Alicat **BIOC-Series** Mass Flow Controllers

50 slpm of Full Scale through 500 slpm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE	
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± (0.8% of Reading + 0.2% of Full Scale)
Repeatability (2σ)	± (0.2% of Reading + 0.02% of Full Scale)
Steady State Control Range <sup>2</sup>	0.01% - 100% of Full Scale
Temperature Sensitivity	Mass Flow Zero and Span Shift: 0.02% Full Scale / °C
Pressure Sensitivity	Mass Flow Zero and Span Shift: ± (0.08% of Reading + 0.02% Full Scale) / atm
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)
Temperature Accuracy	± 0.75°C
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	65 - 255 ms (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. Consult Alicat if higher accuracy is required.
- 2 Achievable steady state control may be limited by user-configurable PID tuning and process conditions. Dynamic control performance is also limited by control response time, which may vary with the flow rate.

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 PSID differential pressure
Ingress Protection	IP40 (IP66 Option Available)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS	
Analog I/O	0-5 VDC (Serial and Modbus RTU only)
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial
Electrical Connection	8 pin M12 or Protocol Dependent
Power Requirements <sup>3</sup>	24 VDC, 1,000 mA max
Data Update Rate <sup>3</sup>	Serial: 40 Hz at 19200 baud Analog: 1000 Hz
Display Update Rate	10 Hz
Analog Signal Accuracy	± 0.1% of Full Scale additional uncertainty
Typical Control Response Time	150 ms to 63% of step change (T63)
Valve Function	Normally Closed

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

FEATURES	
STP Reference Conditions	25°C and 1 atm (Default), user configurable
NTP Reference Conditions	0°C and 1 atm (Default), user configurable
Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
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™	Allows 20 user definable gas mixes. Up to 5 constituent gases per mix, down to percentages of 0.01%

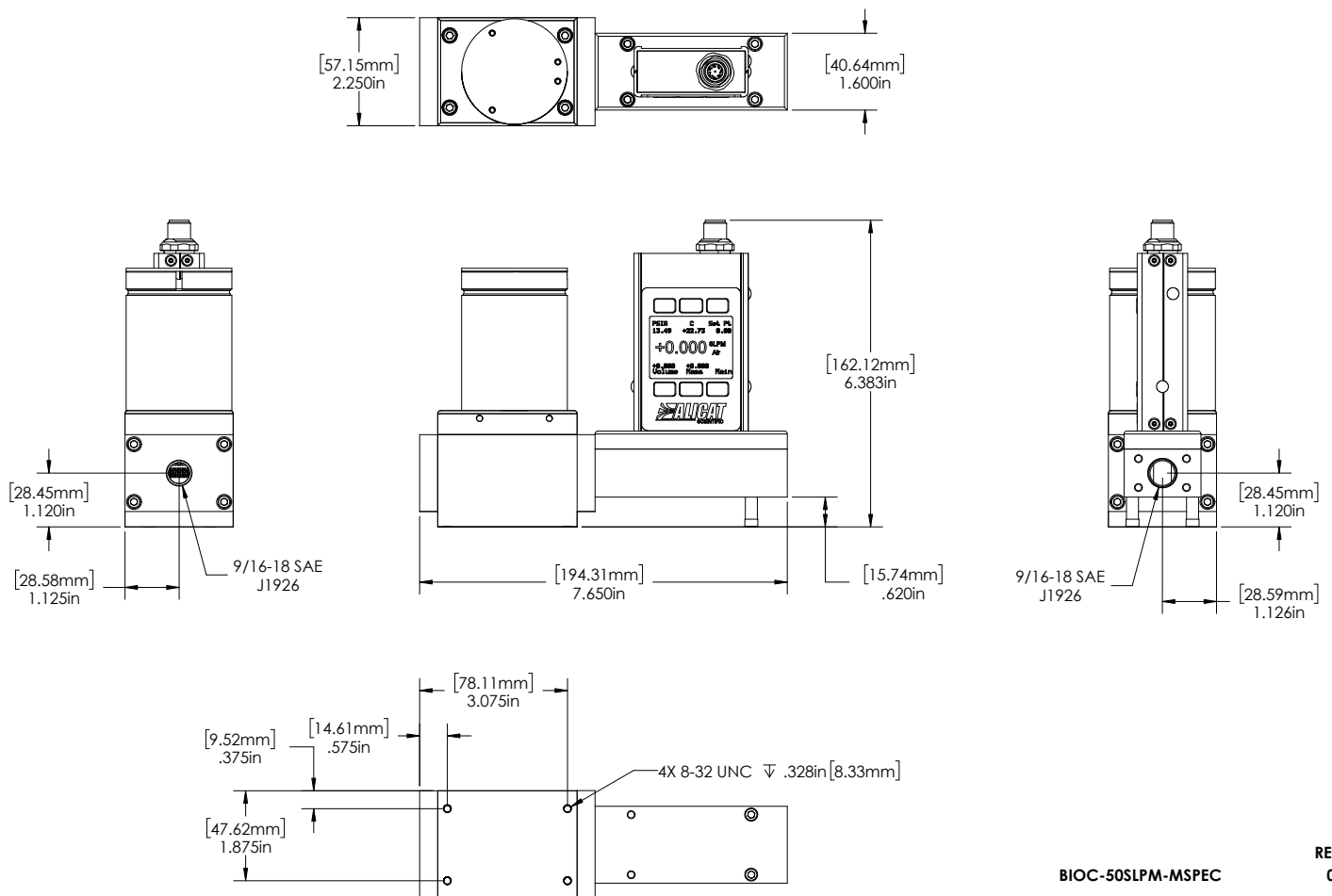
## Wetted Materials

<b>FLOW BODY WETTED MATERIALS</b>	<b>OPTION</b>	<b>VALVE WETTED MATERIALS</b>
316L Stainless Steel, USP VI FDA Certified Viton Elastomers	A	FFKM, 316L Stainless Steel, Elgiloy Super Alloy, Sandvik Super Alloy
Each controller has 3 parts: Flow body · Sensor · Valve	B	302/303/430FR Stainless Steel, Brass, Viton
	C	302/303/304/410 Stainless Steel, Viton, Delrin
ASME BPE-2016 Compliance Requires both Valve A and Sensor A	<b>OPTION</b>	<b>SENSOR WETTED MATERIALS</b>
	A	316L Stainless Steel
	B	Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

**BIOC-Series**

0 – 50 slpm

0 – 100 slpm



BIOC-50SLPM-MSPEC

REV.  
0

**Flow Range Specific Specifications**

FULL SCALE FLOW MASS CONTROLLER	PRESSURE DROPS <sup>5</sup> AT FS FLOW (PSID) VENTING TO ATMOSPHERE	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>6</sup>	PROCESS CONNECTIONS <sup>7</sup>
50 slpm	2.0	9.0 lb	6.4"H x 7.7"W x 2.3"D	3/16-18 SAE6 Female
100 slpm	3.2			

5 Lower Pressure Drops Available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

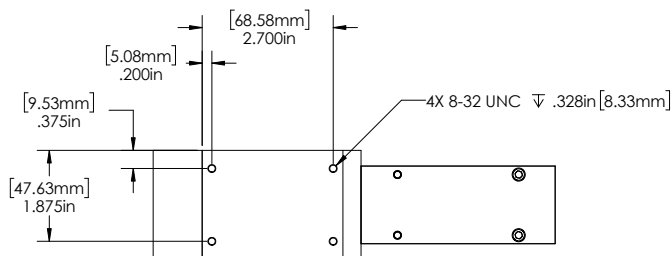
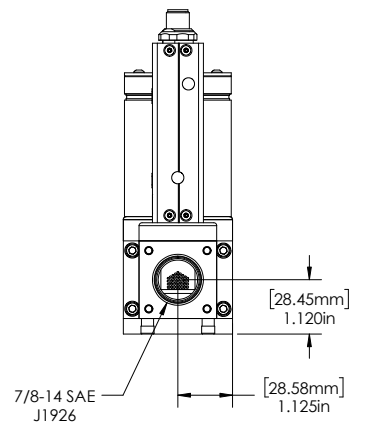
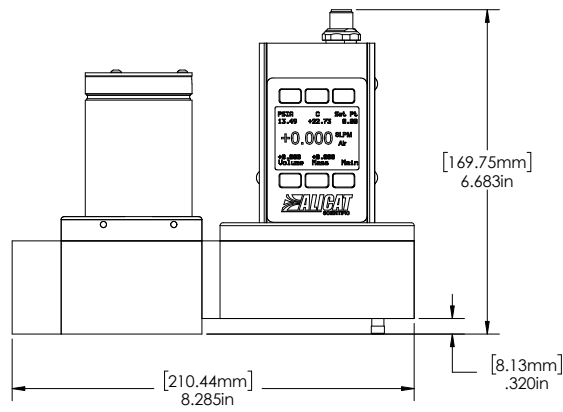
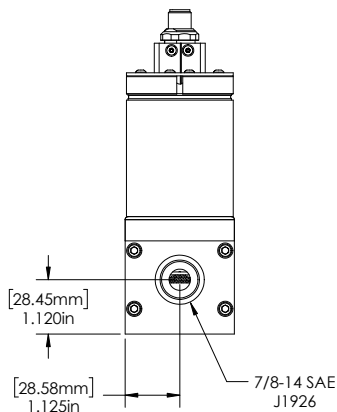
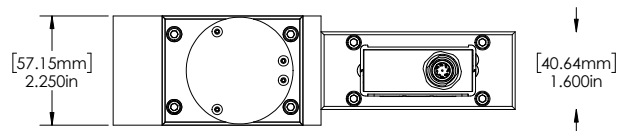
6 See drawings for metric equivalents.

7 Additional process connections available on request. Consult Alicat for more information.

**BIOC-Series**

0 – 200 slpm

0 – 500 slpm



MCRBIO-500SLPM-MSPEC

REV.  
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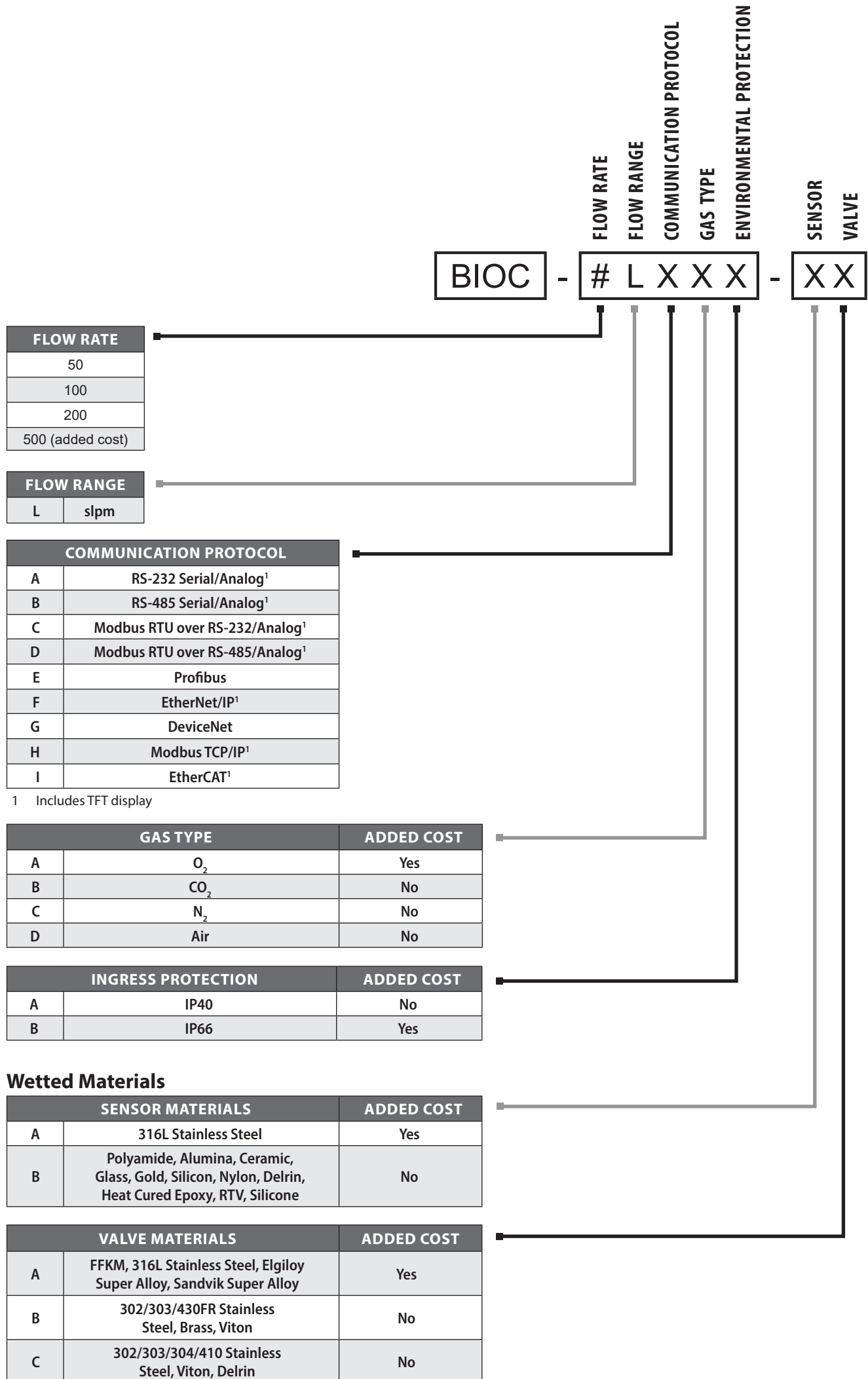
**Flow Range Specific Specifications**

FULL SCALE FLOW MASS CONTROLLER	PRESSURE DROPS AT FS FLOW (PSID) VENTING TO ATMOSPHERE	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>6</sup>	PROCESS CONNECTIONS <sup>7</sup>
250 slpm	2.4	9.0 lb	6.7"H x 8.3"W x 2.3"D	7/8-14 SAE10 Female
500 slpm	6.5			

5 Lower Pressure Drops Available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

6 See drawings for metric equivalents.

7 Additional process connections available on request. Consult Alicat for more information.



# Technical Data for Alicat **BIOC-Series** Mass Flow Controllers

10 sccm of Full Scale through 20 slpm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE		
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± 0.6% of Reading	16.7% - 100% of Full Scale Range
	± 0.1% of Full Scale	0% - 16.7% of Full Scale Range
Repeatability (2σ)	± (0.1% of Reading + 0.02% of Full Scale)	
Steady State Control Range <sup>2</sup>	0.01% - 100% of Full Scale	
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 1 atm	
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)	
Temperature Accuracy	± 0.75°C	
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)	
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading	Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	< 10 ms (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. Consult Alicat if higher accuracy is required.
- 2 Achievable steady state control may be limited by user-configurable PID tuning and process conditions. Dynamic control performance is also limited by control response time, which may vary with the flow rate.

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 PSID differential pressure
Ingress Protection	IP40 (consult Alicat for additional options)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS		
Analog I/O	0-5 VDC (Serial and Modbus RTU only)	
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial	
Electrical Connection	8 pin M12 or Protocol Dependent	
Power Requirements <sup>3</sup>	12-24 VDC, 550 mA min.	
Data Update Rate <sup>3</sup>	Serial: 40 Hz at 19200 baud	Analog: 1000 Hz
Display Update Rate	10 Hz	
Analog Signal Accuracy	± 0.1% of Full Scale additional uncertainty	
Typical Control Response Time	30 ms to 63% of step change (T63)	
Valve Function	Normally Closed	

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

FEATURES	
STP Reference Conditions	25°C and 1 atm (Default), user configurable
NTP Reference Conditions	0°C and 1 atm (Default), user configurable
Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
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™	Allows 20 user definable gas mixes. Up to 5 constituent gases per mix, down to percentages of 0.01%

## Wetted Materials

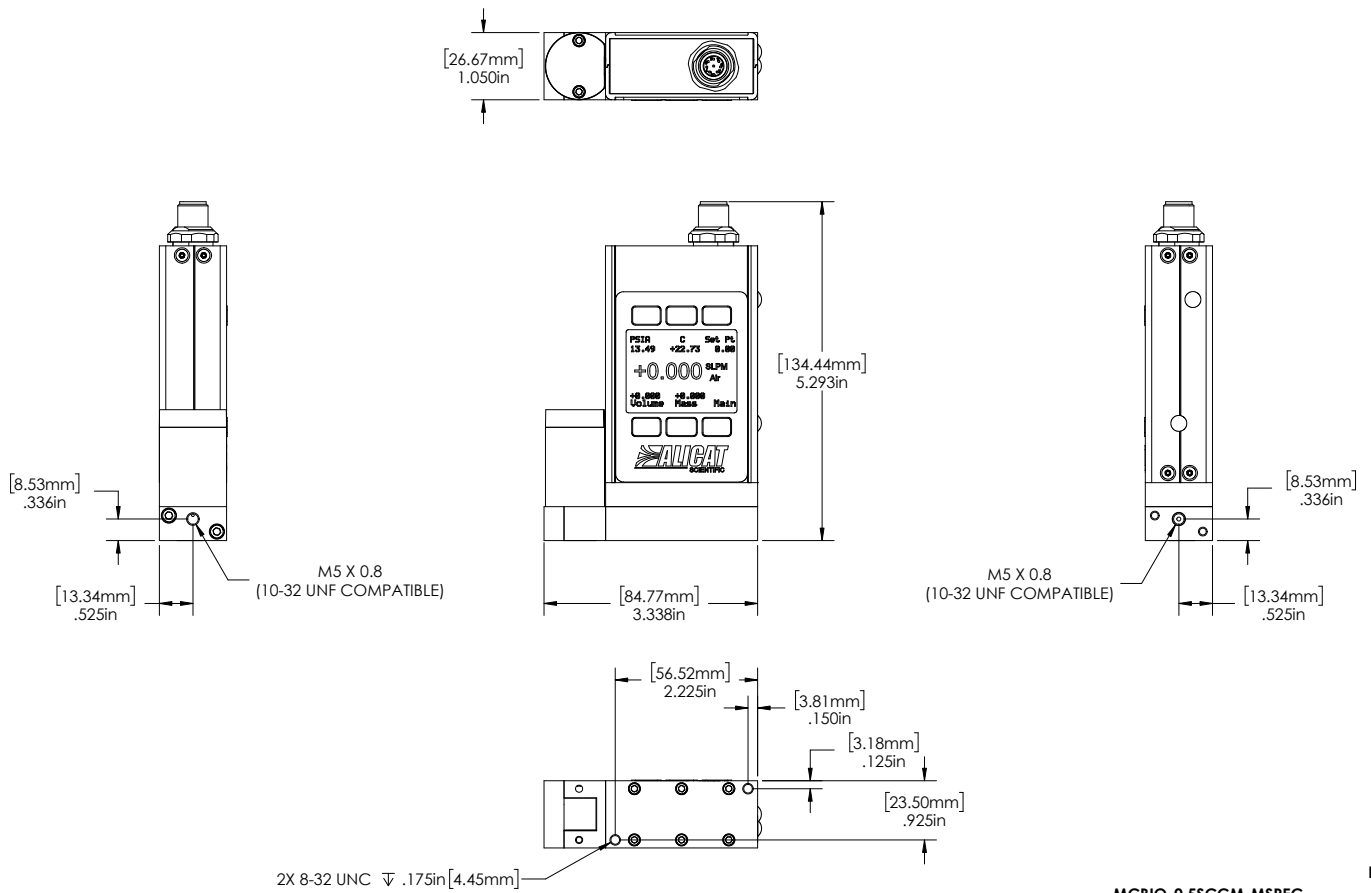
<b>FLOW BODY WETTED MATERIALS</b> 316L Stainless Steel, USP VI FDA Certified Viton Elastomers	<b>OPTION</b> <b>VALVE WETTED MATERIALS</b>
<b>Each controller has 3 parts:</b> <b>Flow body · Sensor · Valve</b>	A      FFKM, 316L Stainless Steel, Elgiloy Super Alloy, Sandvik Super Alloy
	B      302/303/430FR Stainless Steel, Brass, Viton
<b>ASME BPE-2016 Compliance Requires</b> <b>both Valve A and Sensor A</b>	<b>OPTION</b> <b>SENSOR WETTED MATERIALS</b>
	A      316L Stainless Steel
	B      Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

**BIOC-Series**

0 – 10 sccm

0 – 20 sccm

0 – 50 sccm



MCBIO-0.5SCCM-MSPEC

REV. 0

**Flow Range Specific Specifications**

FULL SCALE FLOW MASS CONTROLLER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>5</sup>	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>6</sup>	PROCESS CONNECTIONS <sup>7</sup>
10 sccm – 50 sccm	1.0	0.8 lb	5.3"H x 3.4"W x 1.1"D	M-5 (10-32) Female

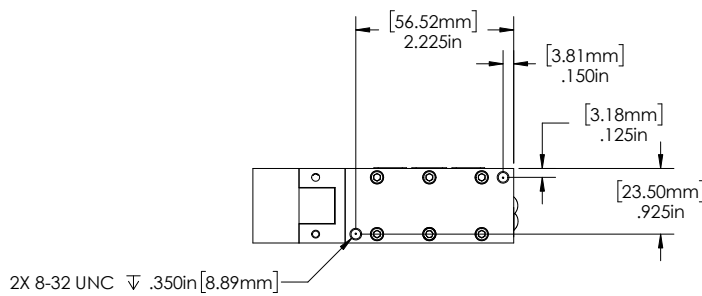
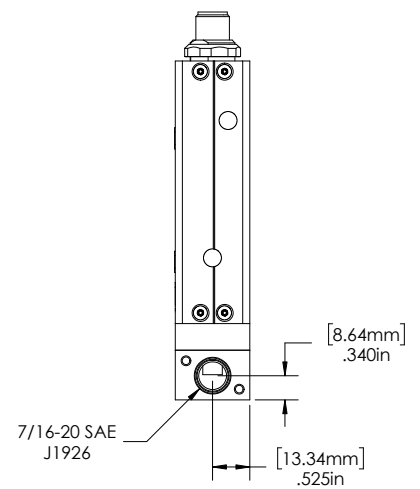
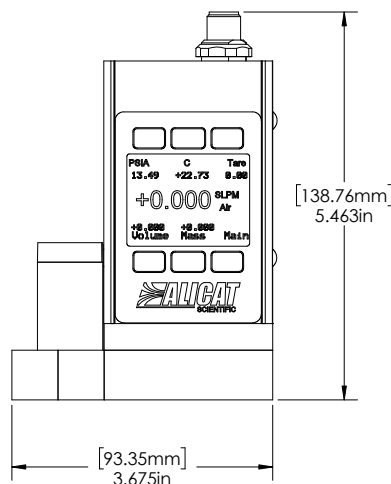
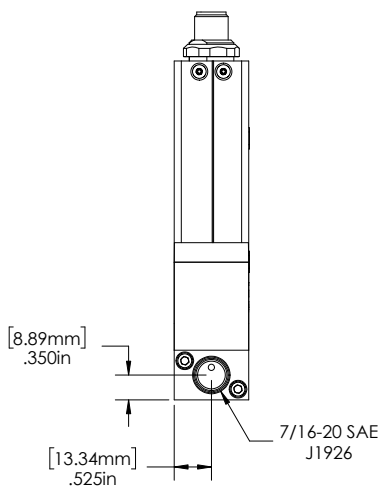
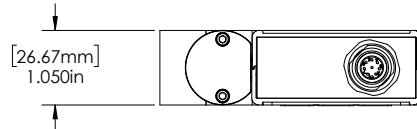
5 Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

6 See drawings for metric equivalents.

7 Additional process connections available on request. Consult Alicat for more information.

**BIOC-Series**

0 – 100 sccm	0 – 1 slpm
0 – 200 sccm	0 – 2 slpm
0 – 500 sccm	0 – 5 slpm
	0 – 10 slpm
	0 – 20 slpm



MCBIO-100SCCM-MSPEC

REV. 0

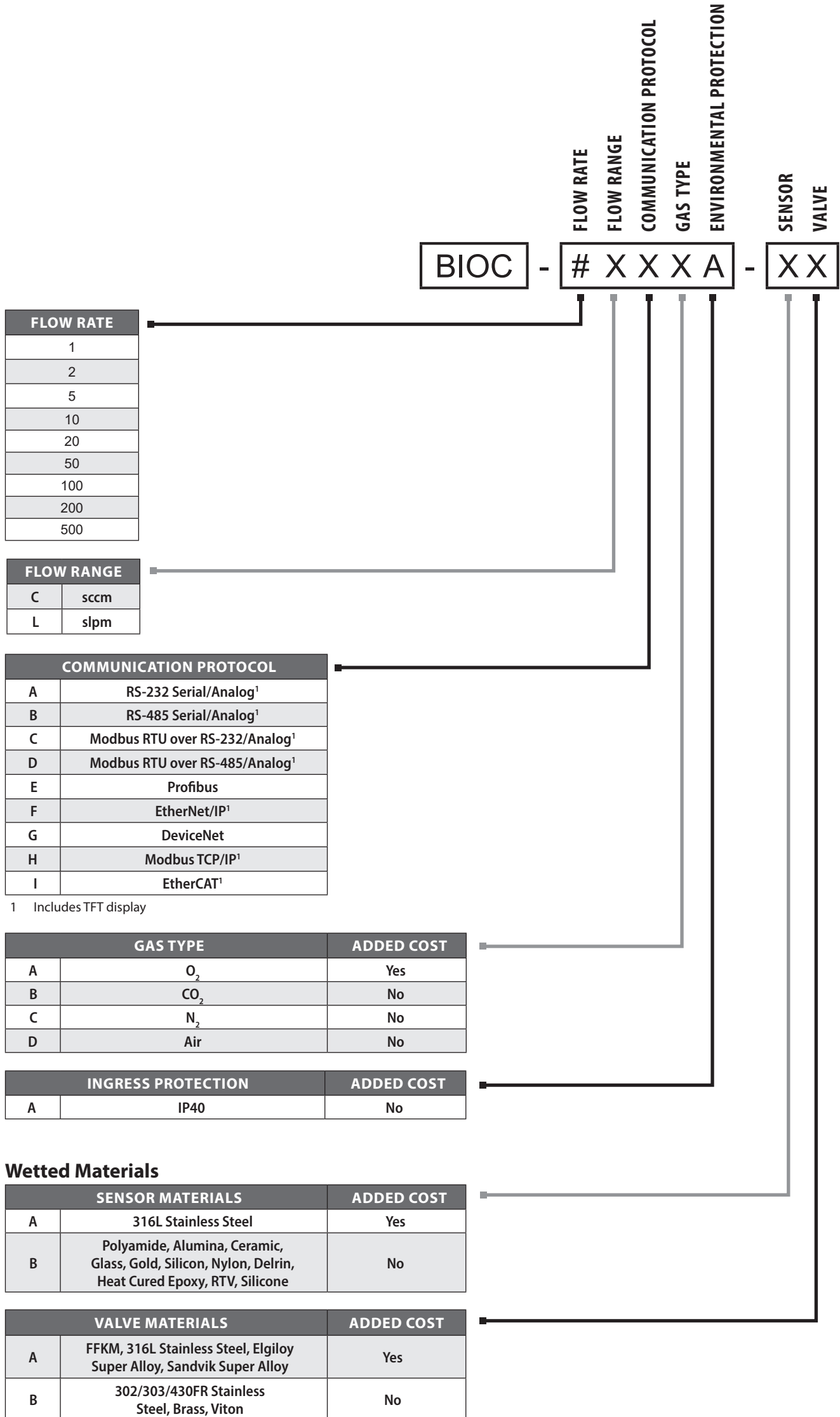
**Flow Range Specific Specifications**

FULL SCALE FLOW MASS CONTROLLER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>5</sup>	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>6</sup>	PROCESS CONNECTIONS <sup>7</sup>
100 sccm – 500 sccm	1.0	1.0 lb	5.5"H x 3.7"W x 1.1"D	7/16-20 SAE <sup>4</sup> Female
1 slpm	1.5			
2 slpm	3.0			
5 slpm	2.0			
10 slpm	5.5			
20 slpm	20.0			

<sup>5</sup> Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

<sup>6</sup> See drawings for metric equivalents.

<sup>7</sup> Additional process connections available on request. Consult Alicat for more information.





# Technical Data for Alicat **BIOC-Series** Mass Flow Controllers

1 sccm of Full Scale through 5 sccm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE	
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± (0.8% of Reading + 0.2% of Full Scale)
Repeatability (2σ)	± (0.2% of Reading + 0.02% of Full Scale)
Steady State Control Range <sup>2</sup>	0.01% - 100% of Full Scale
Temperature Sensitivity	Mass Flow Zero and Span Shift: 0.02% Full Scale / °C
Pressure Sensitivity	Mass Flow Zero and Span Shift: ± (0.08% of Reading + 0.02% Full Scale) / atm
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)
Temperature Accuracy	± 0.75°C
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	100 - 1000 ms (flow rate dependent)
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. Consult Alicat if higher accuracy is required.

2 Achievable steady state control may be limited by user-configurable PID tuning and process conditions. Dynamic control performance is also limited by control response time, which may vary with the flow rate.

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 PSID differential pressure
Ingress Protection	IP40 (consult Alicat for weatherproofing options)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS	
Analog I/O	0-5 VDC (Serial and Modbus RTU only)
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial
Electrical Connection	8 pin M12 or protocol dependent
Power Requirements <sup>3</sup>	12-24 VDC, 550 mA min.
Data Update Rate <sup>3</sup>	Serial: 40 Hz at 19200 baud Analog: 1000 Hz
Display Update Rate	10 Hz
Analog Signal Accuracy	± 0.1% of Full Scale additional uncertainty
Typical Control Response Time	100 - 4000 ms to 63% of step change (T63)
Valve Function	Normally Closed

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

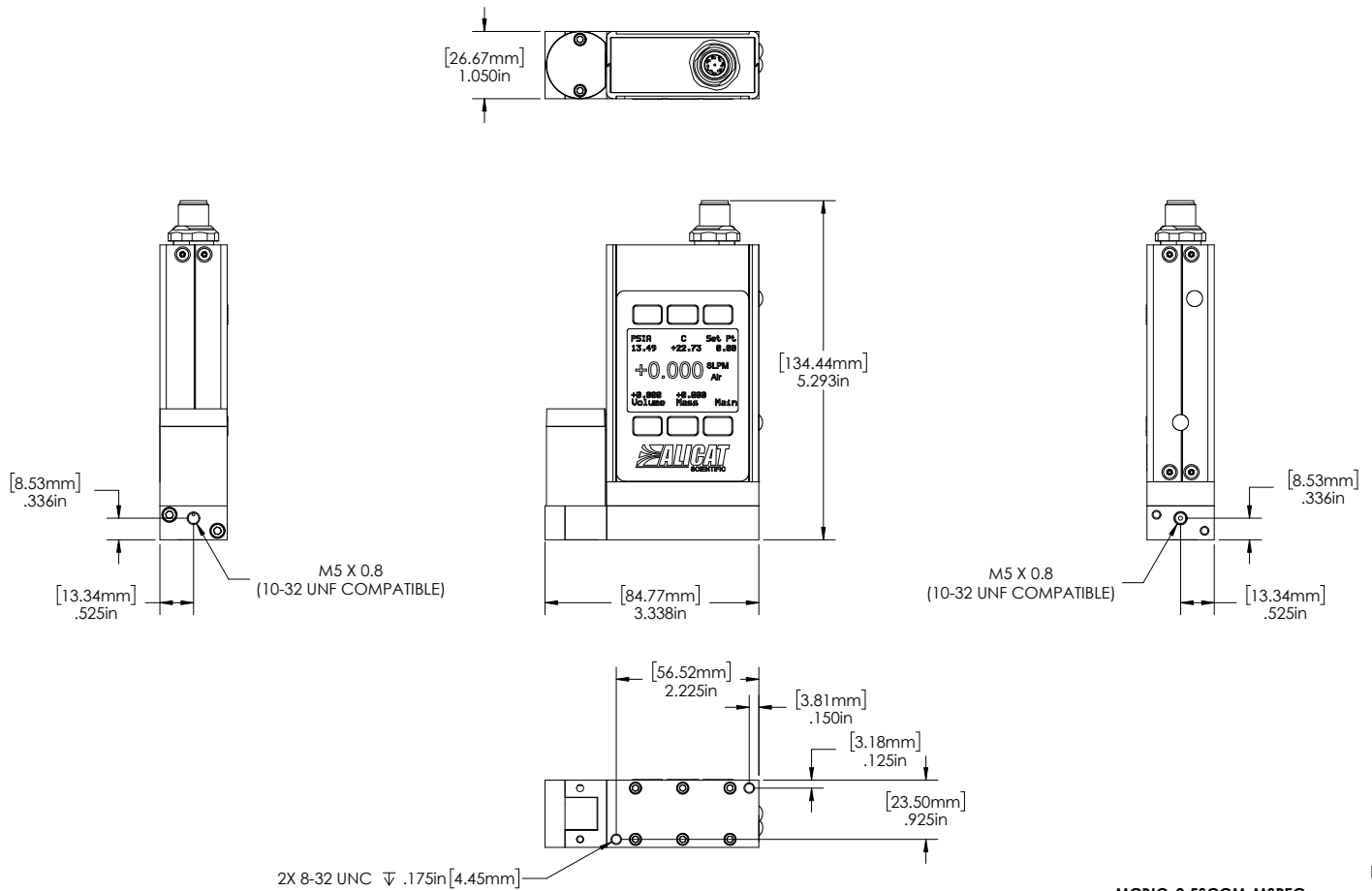
FEATURES	
STP Reference Conditions	25°C and 1 atm (Default), user configurable
NTP Reference Conditions	0°C and 1 atm (Default), user configurable
Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
Gas Select™	98 user selectable gases 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™	Allows 20 user definable gas mixes. Up to 5 constituent gases per mix, down to percentages of 0.01%

## Wetted Materials

FLOW BODY WETTED MATERIALS	OPTION	VALVE WETTED MATERIALS
316L Stainless Steel, USP VI FDA Certified Viton Elastomers	A	FFKM, 316L Stainless Steel, Elgiloy Super Alloy, Sandvik Super Alloy
	B	302/303/430FR Stainless Steel, Brass, Viton
<b>Each controller has 3 parts: Flow body · Sensor · Valve</b>	OPTION	SENSOR WETTED MATERIALS
	A	316L Stainless Steel
<b>ASME BPE-2016 Compliance Requires both Valve A and Sensor A</b>	B	Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

**BIOC-Series**

- 0 – 1 sccm
- 0 – 2 sccm
- 0 – 5 sccm



MCBIO-0.5SCCM-MSPEC

REV. 0

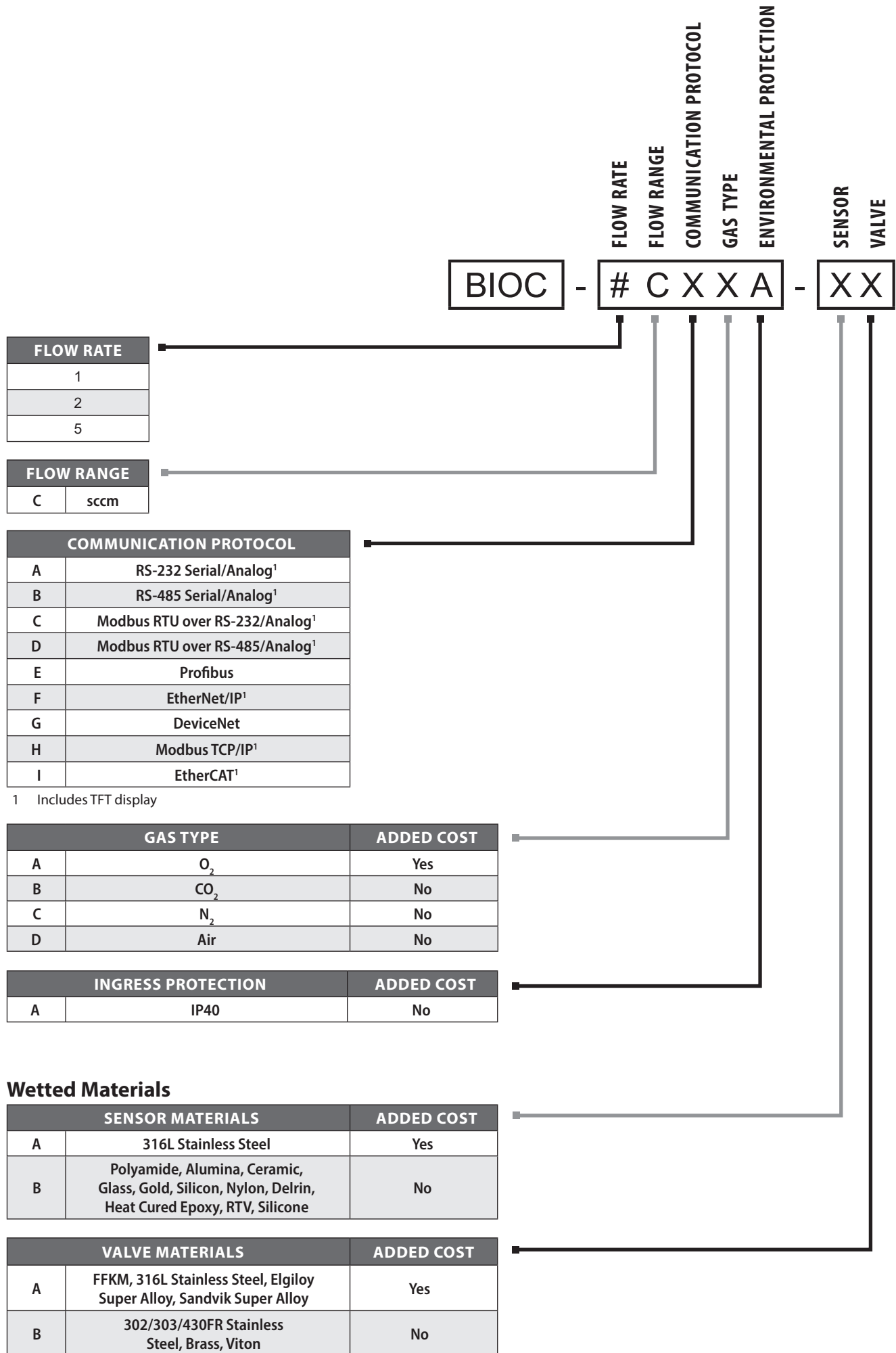
**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	RECOMMENDED INLET PRESSURE <sup>4</sup>	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>5</sup>	PROCESS CONNECTIONS <sup>6</sup>
1 sccm to 5 sccm	20 to 80 PSIG	1.0 lb	5.3"H x 3.4"W x 1.1"D	M-5 (10-32) Female

4 Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

5 See drawings for metric equivalents.

6 Additional process connections available on request. Consult Alicat for more information.



# Technical Data for Alicat **BIO-Series** Mass Flow Meters

50 slpm of Full Scale through 500 slpm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE	
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± (0.8% of Reading + 0.2% of Full Scale)
Accuracy for Bidirectional Meters at calibration conditions after tare	± 0.2% of full scale in addition to base accuracy (above)
Repeatability (2σ)	± (0.2% of Reading + 0.02% of Full Scale)
Flow Measurement Range	0.01% - 100% of Full Scale
Temperature Sensitivity	Mass Flow Zero and Span Shift: 0.02% of Full Scale / °C
Pressure Sensitivity	Mass Flow Zero and Span Shift: ± (0.08% of Reading + 0.02% of Full Scale) / atm
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)
Temperature Accuracy	± 0.75°C
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	65 - 255 ms (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. Consult Alicat if higher accuracy is required.

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 PSID differential pressure
Ingress Protection	IP40 (IP66 option available)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS	
Analog I/O	0-5 VDC Serial and Modbus RTU
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial
Electrical Connection	8 pin M12 or Protocol Dependent
Power Requirements <sup>2</sup>	12-24 VDC, 325 mA min.
Data Update Rate <sup>2</sup>	Serial: 40 Hz at 19200 baud Analog: 1000 Hz
Display Update Rate	10 Hz
Analog Signal Accuracy	± 0.1% of Full Scale additional uncertainty

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

FEATURES	
STP Reference Conditions	25°C and 1 atm (Default), user configurable
NTP Reference Conditions	0°C and 1 atm (Default), user configurable
Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
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™	Allows 20 user definable gas mixes Up to 5 constituent gases per mix, down to percentages of 0.01%

## Wetted Materials

### FLOW BODY WETTED MATERIALS

316L Stainless Steel, USP VI FDA Certified Viton Elastomers

ASME BPE-2016 Compliance Requires Sensor A  
Each meter has 2 parts: Flow body and Sensor

### OPTION

### SENSOR WETTED MATERIALS

A

316L Stainless Steel

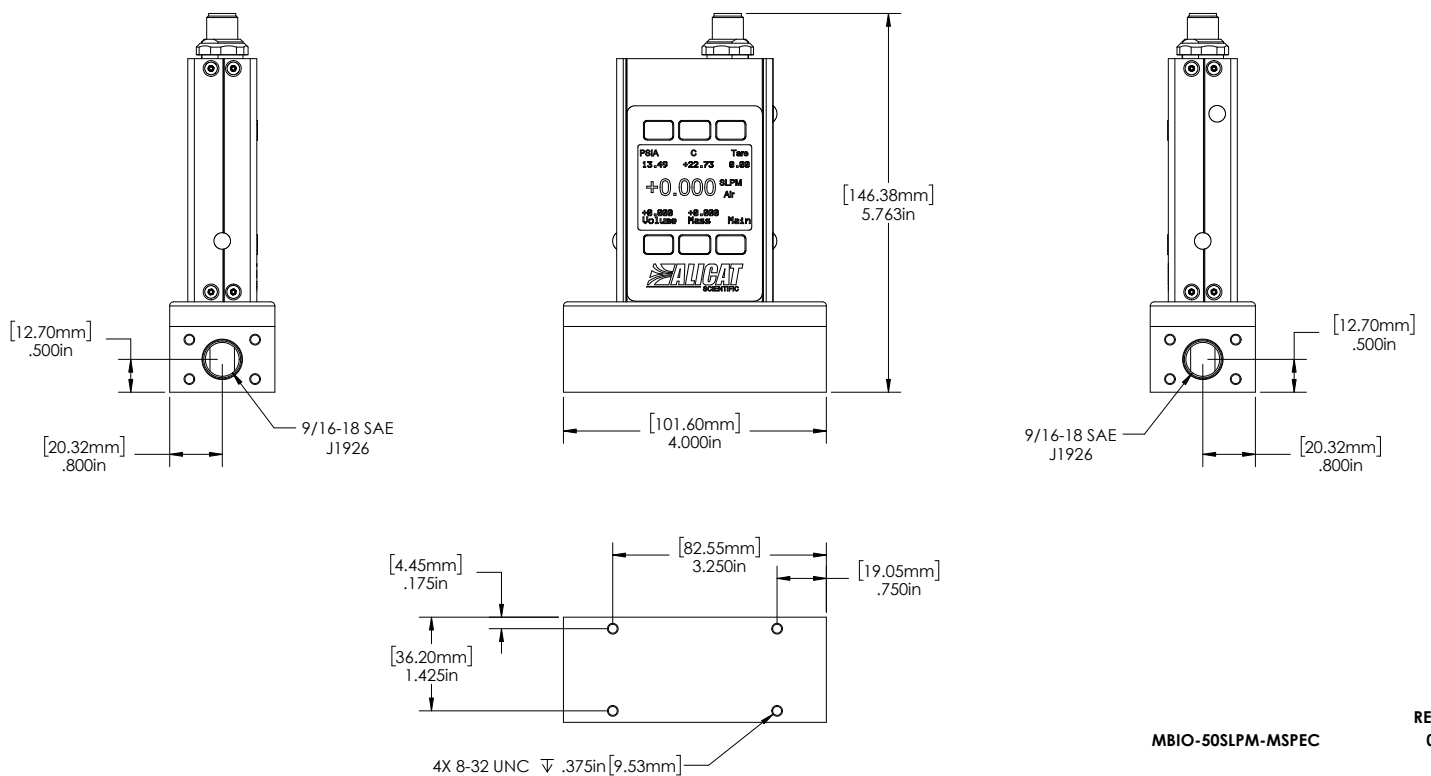
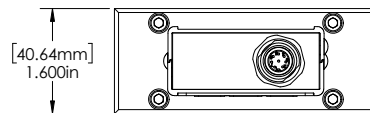
B

Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

**BIO-Series**

0 – 50 slpm

0 – 100 slpm



MBIO-50SLPM-MSPEC

REV. 0

**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>3</sup>	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>4</sup>	PROCESS CONNECTIONS <sup>5</sup>
50 slpm	2.0	2.4 lb	5.8"H x 4.0"W x 1.6"D	1/4"-18 SAE6 Female
100 slpm	2.5			

3 Lower Pressure Drops Available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

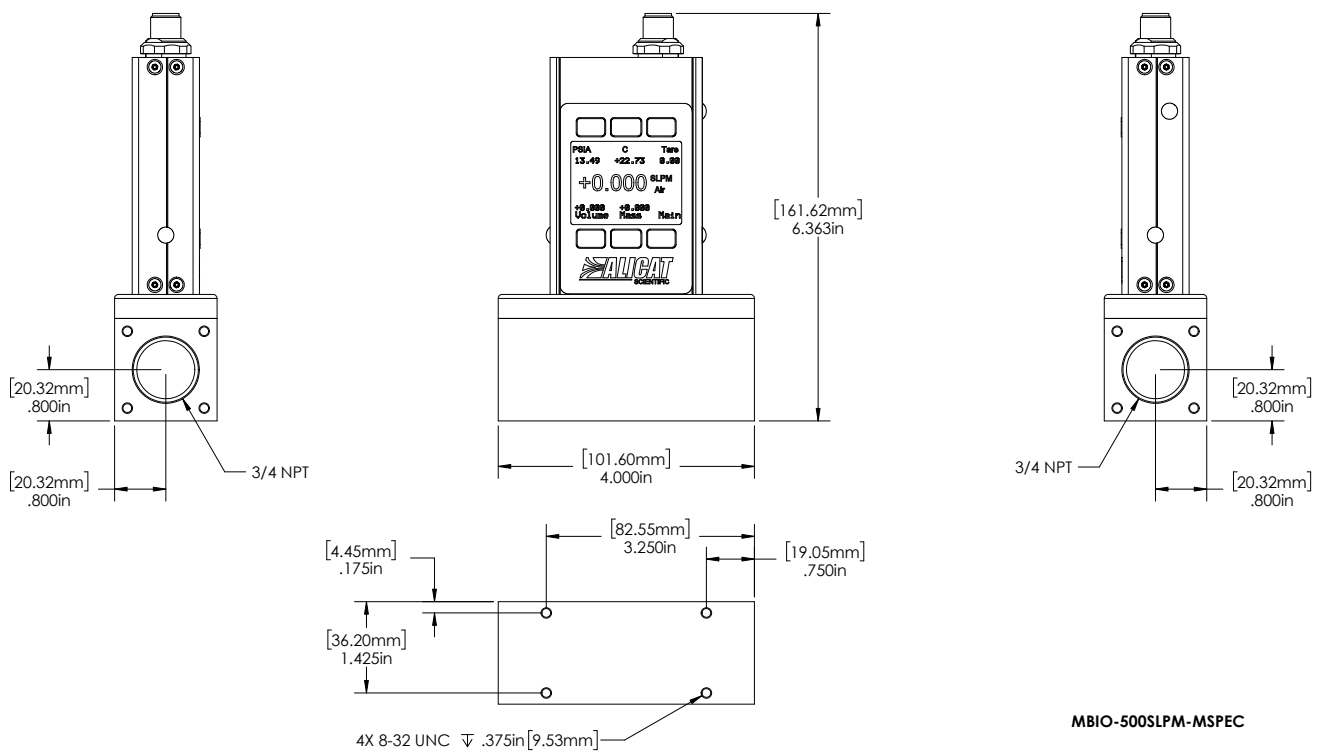
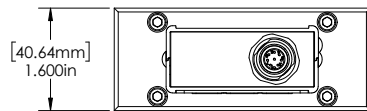
4 See drawings for metric equivalents.

5 Compatible with Swagelok® tube, Parker®, face seal, push connect and compression adapter fittings. VCR and SAE connections upon request.

**BIO-Series**

0 – 250 slpm

0 – 500 slpm



MBIO-500SLPM-MSPEC

REV. 0

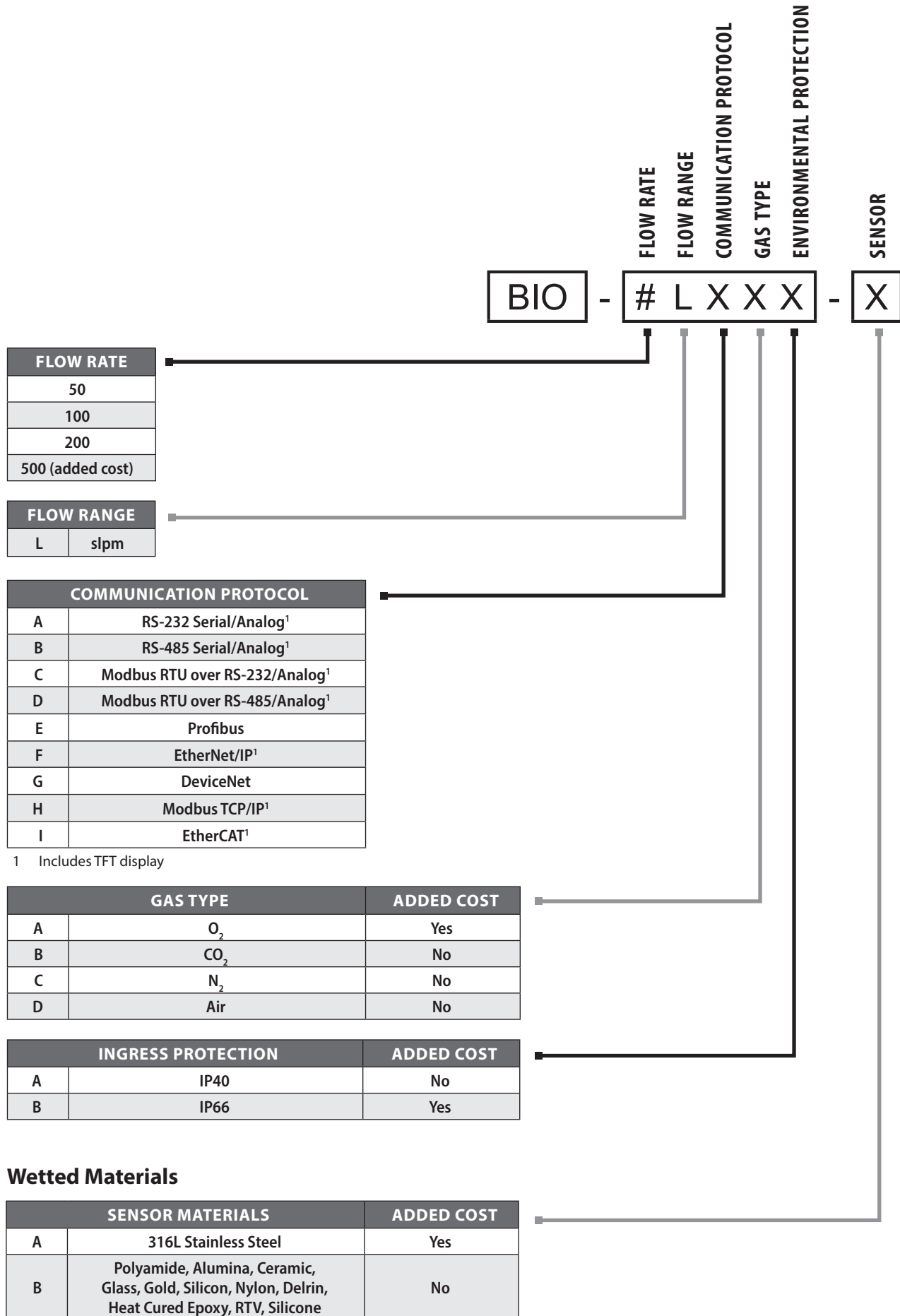
**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>3</sup>	APPROXIMATE WEIGHT	MECHANICAL DIMENSIONS <sup>4</sup>	PROCESS CONNECTIONS <sup>5</sup>
200 slpm	2.1	3.5 lb	6.4"H x 4.0"W x 1.6"D	7/8-14 SAE10 Female
500 slpm	4.0			

3 Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

4 See drawings for metric equivalents.

5 Additional process connections available on request. Consult Alicat for more information.



# Technical Data for Alicat **BIO-Series** Mass Flow Meters

10 sccm of Full Scale through 20 slpm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE		
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± 0.6% of Reading	16.7% - 100% of Full Scale Range
	± 0.1% of Full Scale	0% - 16.7% of Full Scale Range
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: ± 0.01% 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 / atm from calibration pressure	
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)	
Temperature Accuracy	± 0.75°C	
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)	
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading	Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	< 10 ms (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. Consult Alicat if higher accuracy is required.

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 PSID differential pressure
Ingress Protection	IP40 (consult Alicat for additional options)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS		
Analog I/O	0-5 VDC Serial and Modbus RTU only	
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial	
Electrical Connection	8 pin M12 or Protocol Dependent	
Power Requirements <sup>2</sup>	12-24 VDC, 325 mA min.	
Data Update Rate <sup>2</sup>	Serial: 40 Hz at 19200 baud	Analog: 1000 Hz
Display Update Rate	10 Hz	
Analog Signal Accuracy	± 0.1% of Full Scale additional uncertainty	

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

FEATURES	
STP Reference Conditions	25°C and 1 atm (Default), user configurable
NTP Reference Conditions	0°C and 1 atm (Default), user configurable
Color TFT Display with integrated touchpad	Simultaneously displays Mass Flow, Volumetric Flow, Pressure and Temperature
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™	Allows 20 user definable gas mixes Up to 5 constituent gases per mix, down to percentages of 0.01%

## Wetted Materials

FLOW BODY WETTED MATERIALS	OPTION	SENSOR WETTED MATERIALS
316L Stainless Steel, USP VI FDA Certified Viton Elastomers	A	316L Stainless Steel
ASME BPE-2016 Compliance Requires Sensor A Each meter has 2 parts: Flow body and Sensor	B	Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

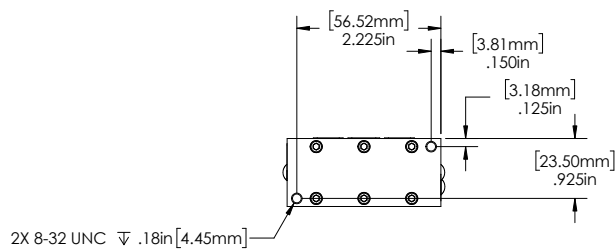
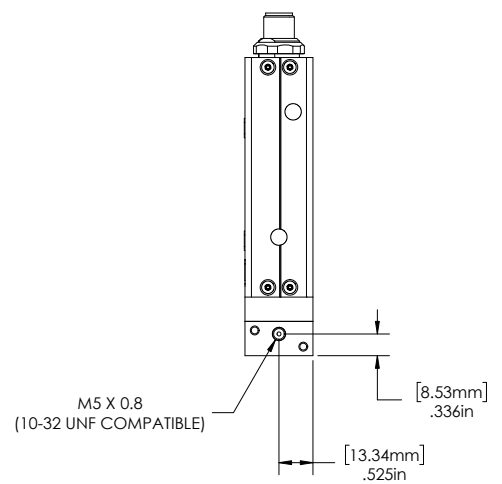
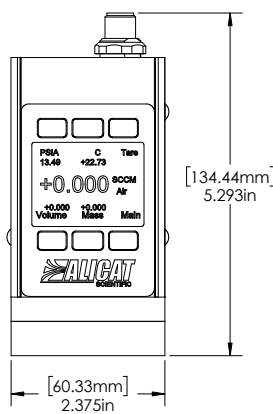
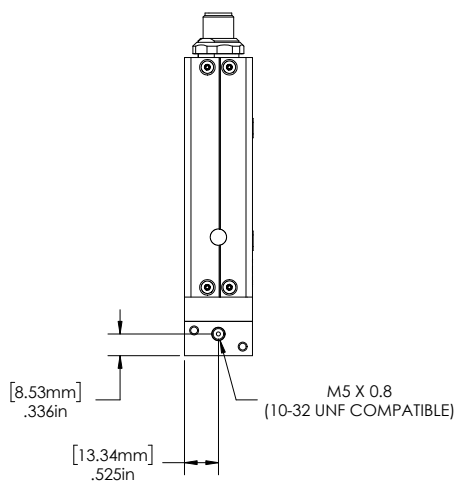
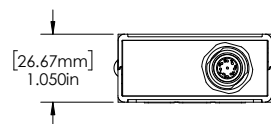


**BIO-Series**

0 – 10 sccm

0 – 20 sccm

0 – 50 sccm



MBIO-0.5SCCM-MSPEC

REV.  
0

**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>3</sup>	PHYSICAL DIMENSIONS <sup>4</sup>	APPROXIMATE WEIGHT	PROCESS CONNECTIONS <sup>5</sup>
10 sccm to 50 sccm	1.0	5.3"H x 2.4"W x 1.1"D	0.8 lb	M-5 (10-32) Female <sup>6</sup>

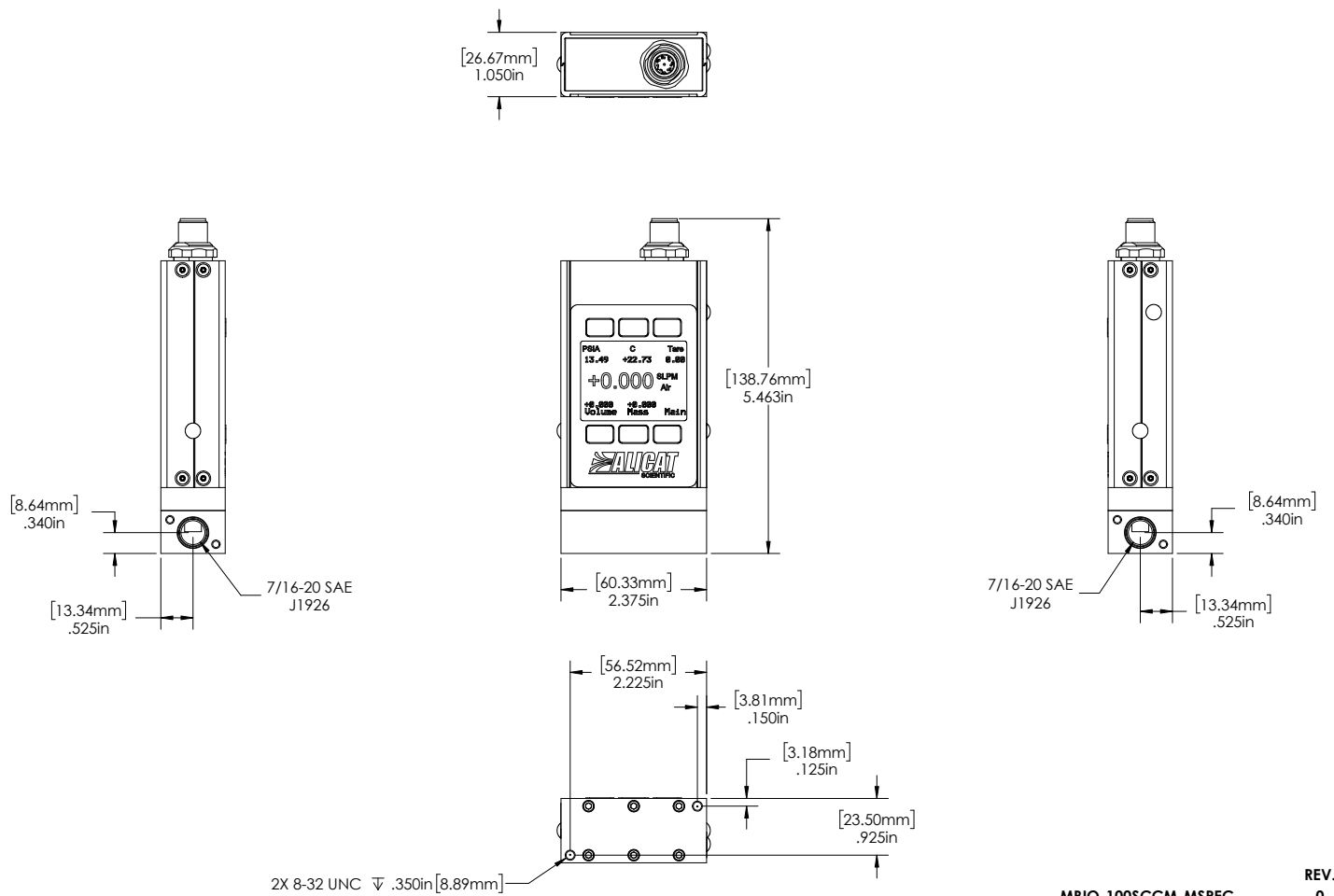
3 Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

4 See drawings for metric equivalents.

5 Additional process connections available on request. Consult Alicat for more information.

**BIO-Series**

0 – 100 sccm	0 – 1 slpm
0 – 200 sccm	0 – 2 slpm
0 – 500 sccm	0 – 5 slpm
	0 – 10 slpm
	0 – 20 slpm



MBIO-100SCCM-MSPEC

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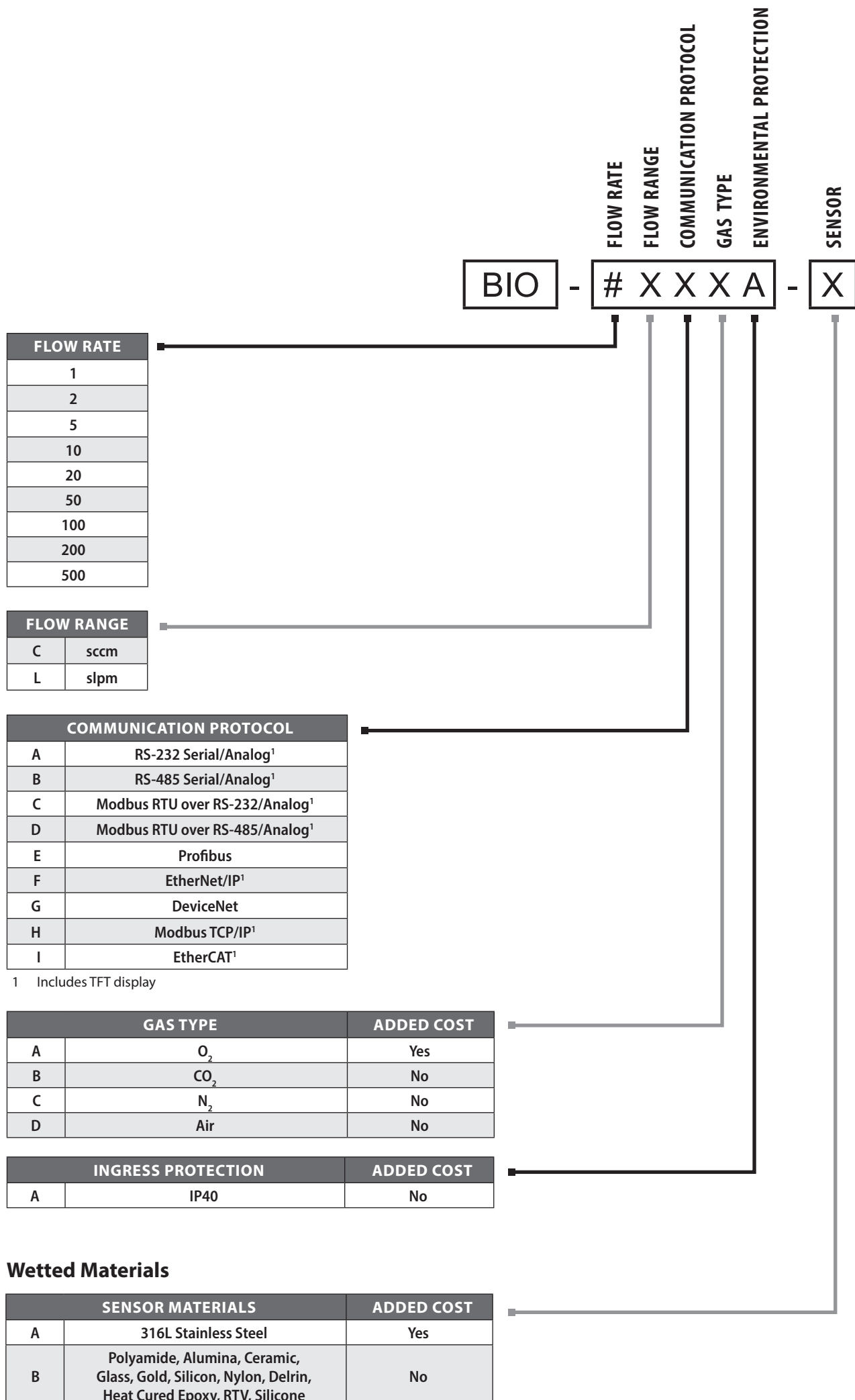
**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>3</sup>	PHYSICAL DIMENSIONS <sup>4</sup>	APPROXIMATE WEIGHT	PROCESS CONNECTIONS <sup>5</sup>
100 sccm to 20 slpm	1.0	5.5"H x 2.4"W x 1.1"D	1.0 lb	7/16-20 SAE <sup>4</sup>

3 Lower pressure drops available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).

4 See drawings for metric equivalents.

5 Additional process connections available on request. Consult Alicat for more information.



# Technical Data for Alicat **BIO-Series** Mass Flow Meters

1 sccm of Full Scale through 5 sccm of Full Scale



## Standard Specifications (Contact Alicat for available options.)

SENSOR PERFORMANCE	
Mass Flow Accuracy at calibration conditions <sup>1</sup>	± (0.8% of Reading + 0.2% of Full Scale)
Repeatability (2σ)	± (0.2% of Reading + 0.02% of Full Scale)
Flow Measurement Range	0.01% - 100% of Full Scale
Temperature Sensitivity	Mass Flow Zero and Span Shift: 0.02% Full Scale / °C
Pressure Sensitivity	Mass Flow Zero and Span Shift: ± (0.08% of Reading + 0.02% of Full Scale) / atm
Operating Temperature Range	-10 to 60°C (consult Alicat for expanded range)
Temperature Accuracy	± 0.75°C
Operating Pressure Full Scale	160 PSIA (consult Alicat for additional options)
Pressure Accuracy	Above 1 atm: ± 0.5% of Reading Below 1 atm: ± 0.07 PSIA
Typical Sensor Response Time	100 - 1000 ms (flow rate dependent)
Typical Warm-Up Time	< 1 s

<sup>1</sup> Stated accuracy is after tare under equilibrium conditions. Extreme gas behavior (especially near state boundaries) can introduce additional flow uncertainties. Consult Alicat if higher accuracy is required.

MECHANICAL	
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Maximum Operating Pressure	Damage possible above 175 PSIA common mode pressure Damage possible above 75 PSID differential pressure
Ingress Protection	IP40 (consult Alicat for additional options)
Humidity Range	0 to 95% non-condensing
Dimensions, pressure drop, weight, and process connection specifications are listed on mechanical drawing pages	

CONTROL AND COMMUNICATIONS	
Analog I/O	0-5 VDC Serial and Modbus RTU only
Digital I/O Options	DeviceNet, EtherCAT, EtherNet/IP, Modbus RTU over RS-232, Modbus RTU over RS-485, Modbus TCP/IP, Profibus, RS-232 Serial, RS-485 Serial
Electrical Connection	8 pin M12 or protocol dependent
Power Requirements <sup>2</sup>	12-24 VDC, 325 mA min.
Data Update Rate <sup>2</sup>	Serial: 40 Hz at 19200 baud Analog: 1000 Hz
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.

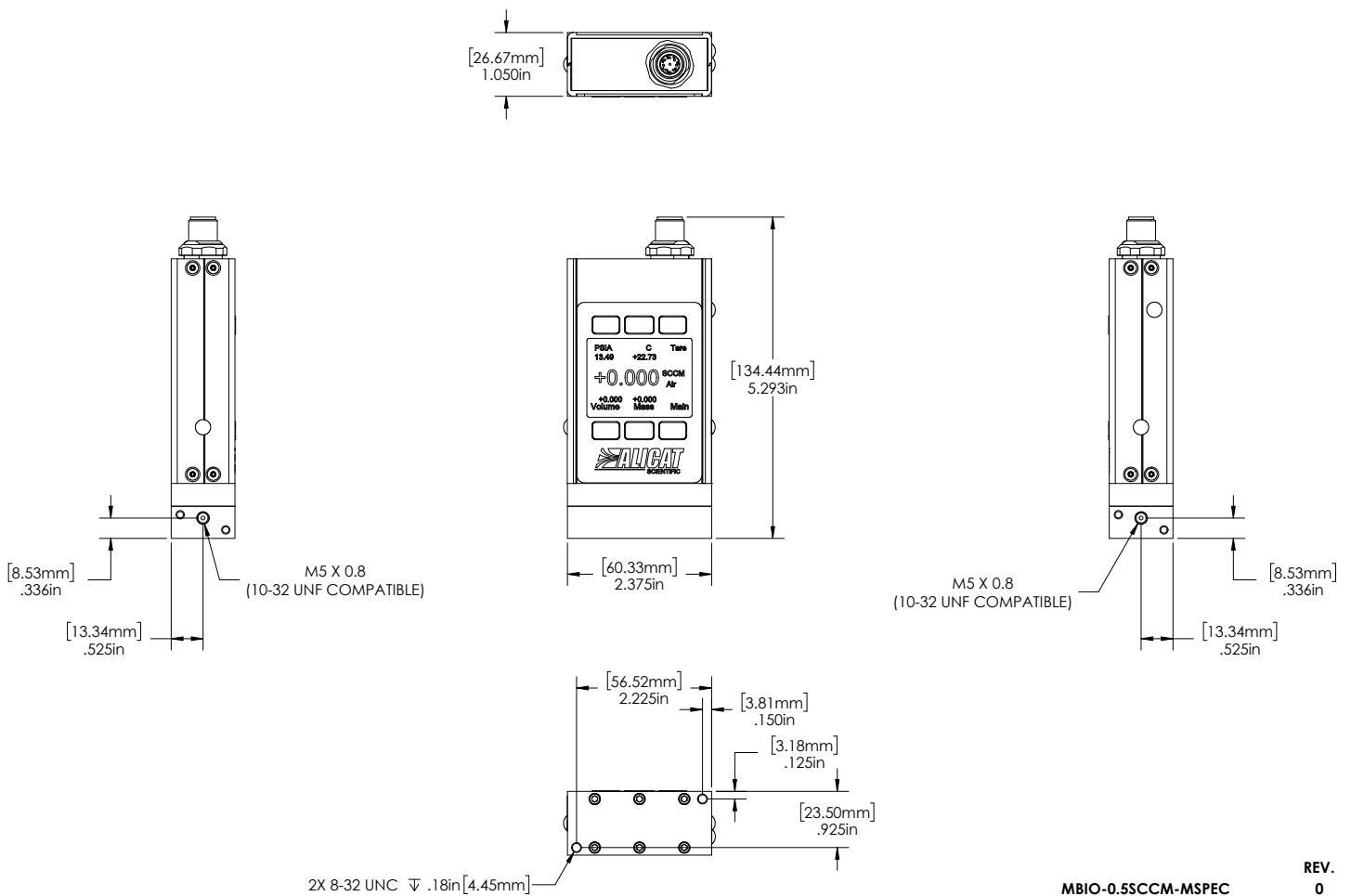
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ASME BPE-2016 Compliance Requires Sensor A Each meter has 2 parts: Flow body and Sensor	B	Polyamide, Alumina, Ceramic, Glass, Gold, Silicon, Nylon, Delrin, Heat Cured Epoxy, RTV, Silicone

**BIO-Series**

- 0 – 1 sccm
- 0 – 2 sccm
- 0 – 5 sccm



MBIO-0.5SCCM-MSPEC

REV. 0

**Flow Range Specific Specifications**

FULL SCALE FLOW MASS METER	PRESSURE DROP AT FS FLOW (PSID) VENTING TO ATMOSPHERE <sup>3</sup>	PHYSICAL DIMENSIONS <sup>4</sup>	APPROXIMATE WEIGHT	PROCESS CONNECTIONS <sup>5</sup>
1 sccm to 5 sccm	1.0	5.3"H x 2.4"W x 1.1"D	0.8 lb	M-5 (10-32) Female

- 3 Lower Pressure Drops Available, please see our WHISPER-Series mass flow controllers at [www.alicat.com/whisper](http://www.alicat.com/whisper).
- 4 See drawings for metric equivalents
- 5 Additional process connections available on request. Consult Alicat for more information.

## Product Model Number Configuration

