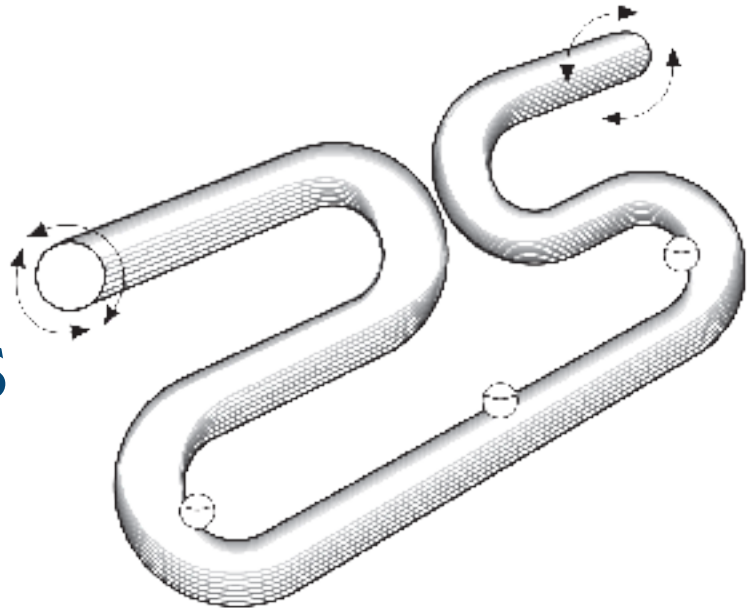




# Coriolis Mass Flowmeters

Flow rate 0.09 to 9.0 kg/min  
(0.2 to 20 lb/min)



ISO 9001 Certified Manufacturing Facility

## DESCRIPTION

The **m**<sup>®</sup> m012 provides accurate, continuous direct measurement of mass, density, temperature and percent solids over the flow range 0.09 to 9.0 kg/min (0.2 to 20 lb/min).

## DESIGN FEATURES

### ACCURACY

Patented dual omega-shaped tubes provide outstanding sensitivity to Coriolis forces. **m**<sup>®</sup> mass flow accuracy is  $\pm 0.10\%$  and the mass flow rate repeatability is  $\pm 0.10\%$ . Its density accuracy is  $\pm 0.005$  g/cc over its operating range.

### LOW PRESSURE DROP AND 100:1 TURNDOWN

The **m**<sup>®</sup> transducer is more sensitive to Coriolis forces than conventional mass flowmeters, providing a greater mechanical gain. Fluid velocity requirements are much lower to produce a given signal. This results in a lower pressure drop and unequaled 100:1 turndown. Therefore, accuracy never has to be compromised to obtain an acceptable pressure drop.

### RELIABILITY

The smooth-bore, non-obtrusive flow path is free from moving parts, seals and bellows. The omega shapes produce torsional loading instead of bending loading or improved reliability.



- Direct mass, density and temperature measurement
- Patented omega-shaped flowtubes provide unequaled sensitivity to Coriolis force
- Wide 100:1 turndown
- Lowest pressure drop
- Smooth-bore, non-obtrusive flow path free from moving parts
- 316L stainless steel
- 3A-Authorized version available

## MATERIALS OF CONSTRUCTION

Wetted parts: 316L stainless steel  
 Sensor housing: 304L stainless steel  
 3A-Authorized version: Connection facing and flowtube surface finish is equivalent to 32 Ra or better

## ELECTRONICS

DATAMATE 2200™ Mass Flow Computer:  
 (Complete information is available in Technical Specification No. TS-612)  
 NexGen® SFT100 Mass Flow Transmitter:  
 (Complete information is available in Technical Specification No. TS-620)

## HAZARDOUS AREA CLASSIFICATION TABLE

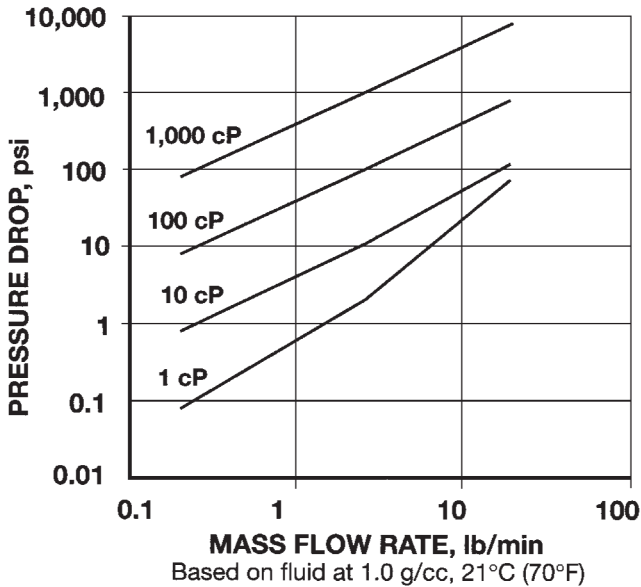
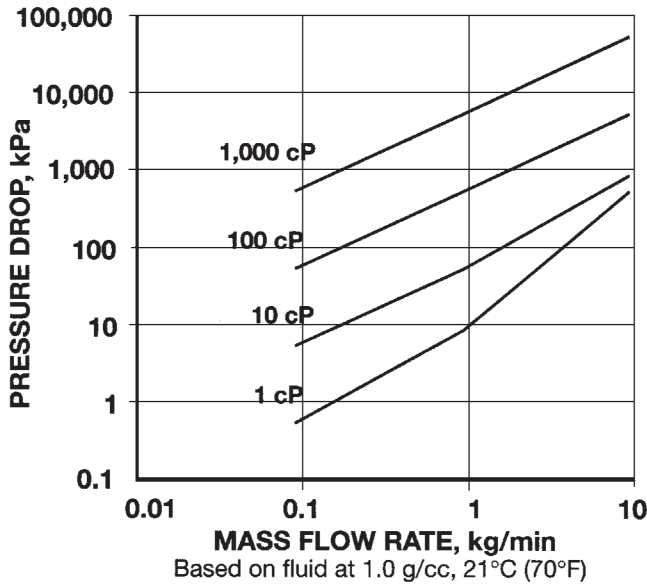
Agency	Components	Method	Class	Div/Zone	Group	Temp. Class	Ambient Temp.
CSA	Transducer	Intrinsic Safety	I, II, III	1, 2	C, D, E, F, G	T5	Note 1
	Datamate	Non-incendive	I	2	A, B, C, D	T3C	Note 5
	NexGen	Explosion Proof	I, II, III	1	C, D, E, F, G	T6	Note 2
		Non-incendive	I	2	A, B, C, D	T4	Note 2
LCIE	Transducer	EX ia		0, 1, 2	IIB	T5, T4, T2	Note 3
	Datamate	N/A	N/A	N/A	Safe Area		
	Nexgen	EX id		1, 2	IIB	T6	Note 4

Note 1: -20°C to 40°C (-4°F to 104°F)  
 Note 2: -20°C to 65°C (-4°F to 149°F)  
 Note 3: T5 where ambient temperature is: -20°C 40°C (-4°F to 104°F)  
 T4 where ambient temperature is: +40°C to +60°C (104°F to 140°F)  
 T2 where ambient temperature is: +60°C to +200°C (140°F to 392°F)  
 Note 4: -20°C to 65°C (-4°F to 149°F)  
 Note 5: +65°C ambient

## m012 OPERATING SPECIFICATIONS

METERING ELEMENT	
Connections: Connection type (flanges)	VCO: 1/2" female <sup>2</sup> ANSI: 1/2"; 150# 300# Raised Face SST 3A-Authorized: 1 <sup>1/2</sup> " Tri-Clamp®
Meter: Tube material Tube shape Nominal tube bore Housing Hazardous area classification  Mass accuracy <sup>1</sup> Mass Repeatability Mass zero stability Turndown ratio Density range Density accuracy Density repeatability Temperature measurement Temperature accuracy Signal output	316L SST Omega 3mm (1/8") 304L SST Transducer is intrinsically safe when connected to an approved mass flow computer (See table above for approval ratings) ±0.10% of rate ± zero stability <sup>1</sup> ±0.10% of rate ±0.0014 kg/min (0.0031 lb/min) 100:1 0.4 to 2.0 g/cc ±0.005 g/cc ±0.0005 g/cc 100 ohm platinum resistance sensor 0.56°C (±1°F) 8-core shielded twisted pair
Fluid: Flow rate Max. temperature Max. operating pressure	0.09 to 9.0 kg/min (0.2 to 20 lb/min) 204°C (400°F) -45°C (-50°F) 137 bar (2000 psi); limited by flange rating
ASSOCIATED INSTRUMENT	
Max. length of signal cable Electrical connections Manufacturer Instrument model number	300m (1000 ft.) 8 core Belden 89892 shielded twisted pair Screw terminal Red Seal Measurement, Inc. Refer to electronics Technical Specification Form Datamate 2200: TS-612 NexGen SFT100: TS-620
<sup>1</sup> All calibration equipment traceable to N.I.S.T. <sup>2</sup> Mating Flange, for MT truck accessories <sup>3</sup> Only available as 1/2" female CAJON VCO connections Requires Male CAJON VCO-8-VCO by SWAGELOCK®.	

# PRESSURE DROP VERSUS FLOW RATE



## DETERMINING PRESSURE DROP

- Flow rate vs. pressure drop varies with viscosity. To approximate m012 pressure drop for fluids with viscosity approximating that of water, locate the point on the 1 -cP curve corresponding with your desired flow rate.
- From that point, locate the nearest horizontal line and follow it to the vertical scale on the left, which indicates pressure drop for the flow rate you selected.
- Divide the pressure drop indicated on the graph by the specific gravity (S) of the process fluid:  

$$\Delta P_{\text{actual}} = \Delta P_{\text{plotted}} / \text{Sp. gr.}$$

## m012 MASS FLOWMETER ORDERING INFORMATION

MODEL NUMBER		DESCRIPTION
m012	X X X X X	
	8	Type Transducer 1/8" SST1
	S	Transducer 1/8" Sanitary Tri Clamp <sup>1</sup>
		Flange
	000	1-1/2' 3A SST Sanitary Tri Clamp
	801	3/8' CAJON VCO2
	812	1/2' 150lb. ANSI RF SST
	813	1/2' 300lb. ANSI RF SST
	XXX	SPECIAL - Contact Factory <sup>2</sup>
		Approvals
	0	General Purpose
	2	CSA
	3	ATEX
		Cable
	000	No Cable
	101	ASM CBL KIT 10ft. <sup>3</sup>
	102	ASM CBL KIT 20ft. <sup>3</sup>
	103	ASM CBL KIT 30ft. <sup>3</sup>
	105	ASM CBL KIT 50ft. <sup>3</sup>
	110	ASM CBL KIT 100ft. <sup>3</sup>
		Electronics
	0	No Electronics
	02	For Use With Nexgen
	03	For Use With Datamate 2200
1Note:		Wetted materials and connection materials must be the same.
2Note:		Only available as 3/8" female CAJON VCO connections Requires Male CAJON VCO-8-VCO by SWAGELOCK®.
3Note:		For a complete list of available cables, contact factory.

## CALCULATING ACTUAL ACCURACY

Use the following formula to calculate accuracy for your selected flow rate:

$$\% \text{ accuracy, } \pm_{\text{actual}} = \{[(0.0010 \text{ m}) + S_0]/\text{m}\} \times 100\%$$

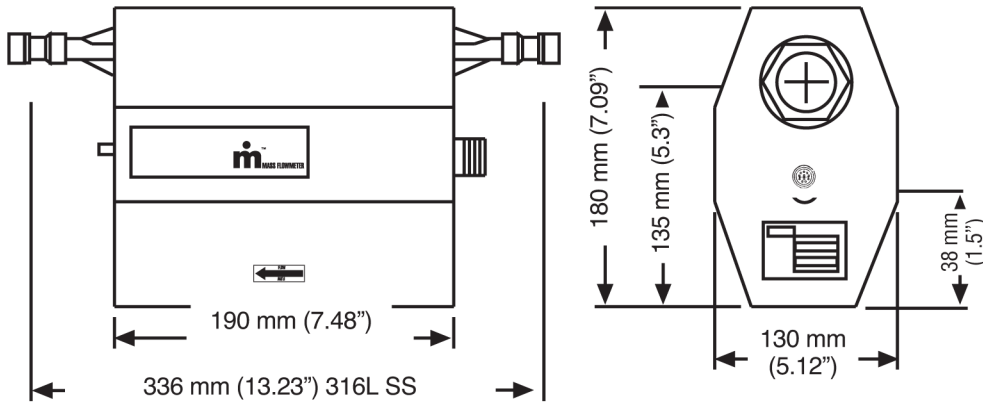
where:

m = mass flow rate, kg/min or lb/min

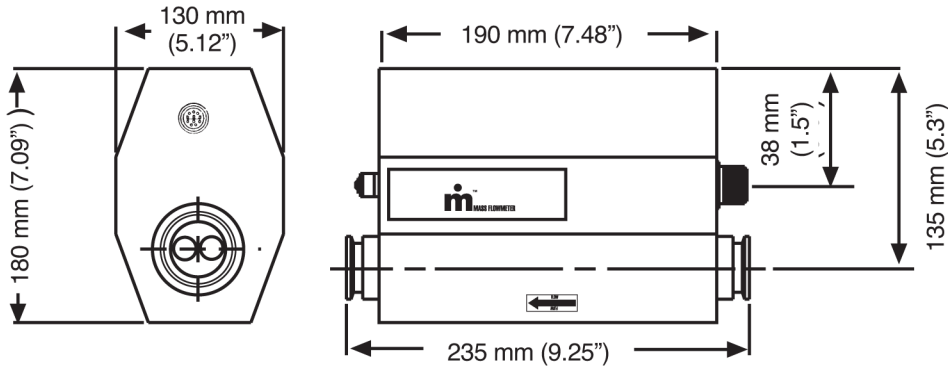
S<sub>0</sub> = mass zero stability, kg/min or lb/min for the m012 flowmeter

# DIMENSIONAL DATA, mm (in.)

m012 3/8" VCO Transducer

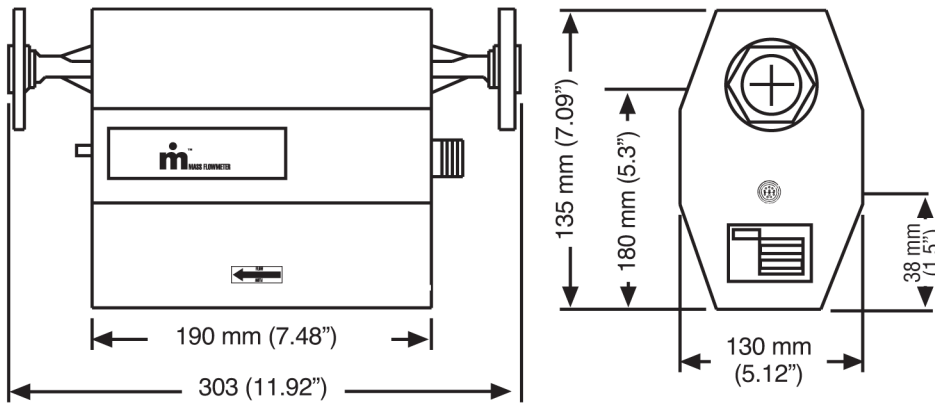


m012 3A-Authorized Transducer



Optional 1-1/2" x 1/2" Tri-Clamp® eccentric reducers are available.

m012 ANSI RF Transducer



Dimensions	
Connection	A 316L SS Wetted Parts
1/2" 150# ANSI RF	303 (11.92)

## WEIGHTS OF COMPONENTS

Transducer: approx. 4.6 kg (10 lbs)  
 Datamate 2200: approx. 5.2 kg (11.5 lbs)  
 NexGen: approx. 7.1 kg (15.6 lbs)

1310 Emerald Road  
 Greenwood, SC 29646  
 USA  
 Phone: 1.800.833.3357  
 Fax: 1.864.223.0341

