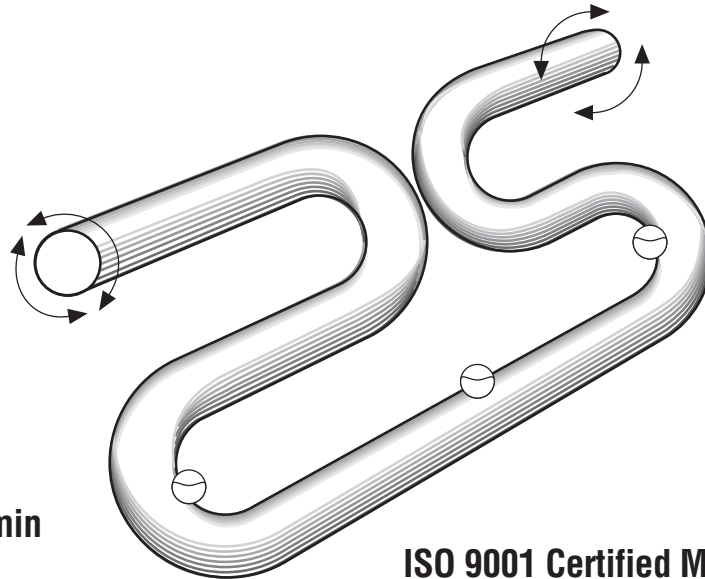


TS-604
Rev. D
Coriolis Mass Flowmeters
m100-XXXXXX



Coriolis Mass Flowmeters

Flow rate 5.0 to 500 kg/min
(11 to 1100 lb/min)



ISO 9001 Certified Manufacturing Facility

SPECIFICATIONS

DESCRIPTION

The \dot{m} m100 provides accurate, continuous, direct measurement of mass, density, temperature and percent solids over the flow range 5.0 to 500 kg/min (11 to 1100 lb/min).

DESIGN FEATURES

ACCURACY

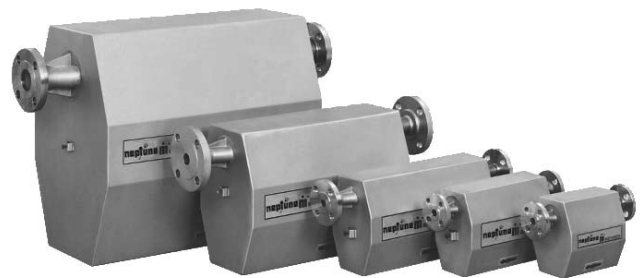
Patented dual omega-shaped tubes provide outstanding sensitivity to Coriolis forces. \dot{m} mass flow accuracy is $\pm 0.10\%$ with the NexGen transmitter and $\pm 0.15\%$ with the Datamate 2100. The m100 \dot{m} mass flow rate repeatability is $\pm 0.10\%$. Its density accuracy is ± 0.001 g/cc over its operating range.

LOW PRESSURE DROP AND 100:1 TURNDOWN

The \dot{m} 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 for improved reliability.



- Direct mass, density and temperature measurement
- Weights & Measures approved for custody transfer applications
- 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 or optional HASTELLOY[®] C-22 wetted parts
- 3A-Authorized version available

MATERIALS OF CONSTRUCTION

Wetted parts: 316L stainless steel
(HASTELLOY® C-22 optional)

Sensor housing: 304L stainless steel

3A-Authorized version: Connection facing and flowtube surface finish is equivalent to 150 grit (Ra32 or 0.80 μm) or better

ELECTRONICS

DATAMATE 2100™ Mass Flow Computer:
(Complete information is available in Technical Specification No. TS-610.)

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

HAZARDOUS AREA CLASSIFICATION TABLE

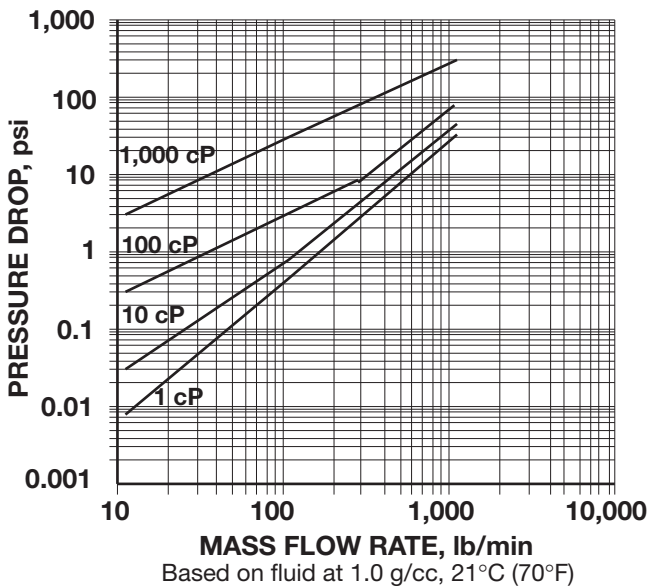
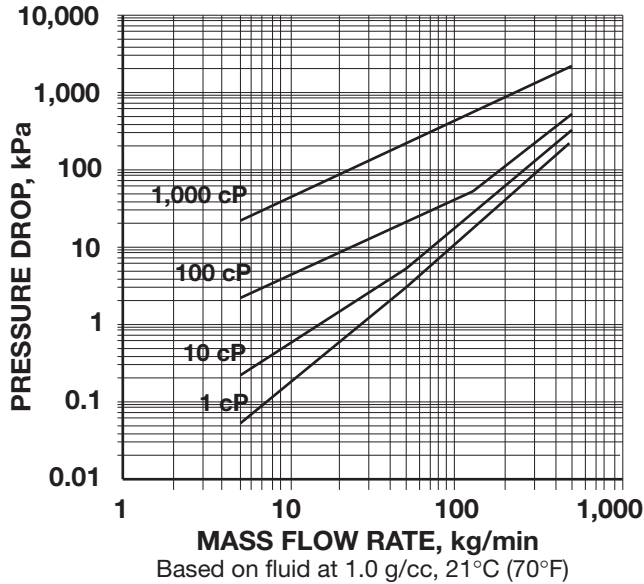
| Agency | Components | Method | Class | Div. Zone | Group | Temp. Class | Ambient Temp. |
|--------|------------|------------------|------------|-----------|-----------|-------------|---------------|
| CSA | Transducer | Intrinsic Safety | I, II, III | 1,2 | C,D,E,F,G | T5 | Note 1 |
| | Datamate | Non-incendive | I | 2 | C,D | T4A | Note 2 |
| | 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 to 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)

m100 OPERATING SPECIFICATIONS

| METERING ELEMENT | |
|--|--|
| Connections: Connection type | ANSI: 1", 1-1/2", 2"; 150#, 300#, 600# RF DIN: DN25, DN50, PN40, PN100 3A-Authorized: 2-1/2" Tri-Clamp® Industrial Tri-Clamp®: 2" |
| Meter: Tube material Tube shape Nominal tube bore Housing Hazardous area classification Mass accuracy ¹ Mass Repeatability Mass zero stability Turndown ratio Density range Density accuracy Density repeatability Temperature measurement Temperature accuracy Signal output | 316L SST or HASTELLOY® C-22 optional Omega 25.4 mm (1.0") 304L SST Transducer is intrinsically safe when connected to an approved mass flow computer (See table above for approval ratings) Datamate 2100: ±0.15% of rate ± zero stability NexGen SFT100: ±0.10% of rate ± zero stability ±0.10% of rate Datamate 2100: ±0.0612 kg/min (0.135 lb/min) NexGen SFT100: ±0.0246 kg/min (0.0543 lb/min) 100:1 Datamate 2100: 0.4 to 2.0 g/cc NexGen SFT100: 0.4 to 3.0 g/cc ±0.001 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 Min. temperature Max. operating pressure | 5.0 to 500 kg/min (11 to 1100 lb/min) 204°C (400°F) -45°C (-50°F) 83 bar (1200 psi); limited by flange rating |
| ASSOCIATED INSTRUMENT | |
| Max. length of signal cable Electrical connections Manufacturer Meter model number Instrument model number | Datamate 2100: 150 m (500 ft.) 8 core Belden 89892 shielded twisted pair NexGen SFT100: 300 m (1000 ft.) 8 core Belden 89892 shielded twisted pair Screw terminal Actaris U.S. Liquid Measurement, Inc. M100 XXXXXX (refer to Ordering Information, page 3) Refer to electronics Technical Specification Form Datamate 2100: TS-610 NexGen SFT100: TS-620 |
| ¹ All calibration equipment traceable to N.I.S.T. | |

PRESSURE DROP VERSUS FLOW RATE



CALCULATING ACTUAL ACCURACY

Use the following formula to calculate \dot{m} accuracy for your selected flow rate:

Datamate: % accuracy, $B1_{actual} = \{ [(0.0015 m) + S_0] / m \} \times 100\%$

NexGen: % accuracy, $B1_{actual} = \{ [(0.0010 m) + S_0] / m \} \times 100\%$

where:

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

S₀ = mass zero stability, kg/min or lb/min for the m100 flowmeter

Note that Actaris offers a free sizing program on three 3-1/2" diskettes to assist you in your selection.

DETERMINING PRESSURE DROP

- Flow rate vs. pressure drop varies with viscosity. To approximate m100 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:

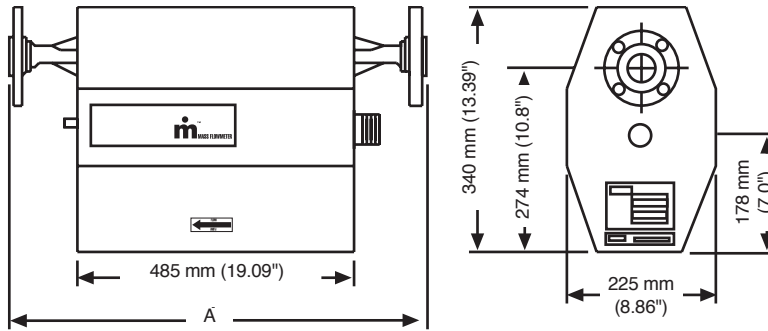
$$\Delta P_{actual} = \Delta P_{plotted} / Sp. gr.$$

m100 MASS FLOWMETER ORDERING INFORMATION

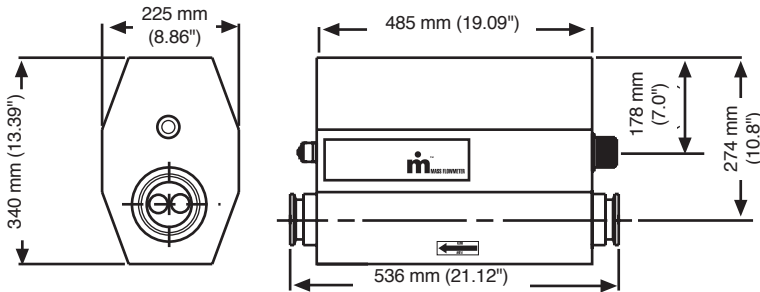
| MODEL NUMBER | DESCRIPTION |
|---|---|
| M100 X X X X X X | |
| | Type |
| 2 | Transducer 1" Hastelloy C-22 ¹ |
| 8 | Transducer 1" SST ¹ |
| S | Transducer 1" SST Sanitary Tri Clamp ¹ |
| | Flange |
| 000 | 2-1/2" 3A SST Sanitary Tri Clamp ⁴ |
| 252 | 2" 150lb. ANSI RF Hastelloy C-22 |
| 253 | 2" 300lb. ANSI RF Hastelloy C-22 |
| 832 | 1" 150lb. ANSI RF SST |
| 833 | 1" 300lb. ANSI RF SST |
| 842 | 1-1/2" 150lb. ANSI RF SST |
| 852 | 2" 150lb. ANSI RF SST |
| 853 | 2" 300lb. ANSI RF SST |
| 856 | 2" SST Industrial Tri Clamp ⁴ |
| 8DE | DN25 PN40 SST |
| 8FE | DN50 PN40 SST |
| XXX | Special - Contact Factory ² |
| | Approvals |
| 0 | General Purpose |
| 2 | CSA |
| 3 | LCIE |
| | W & M |
| 0 | None |
| W | Custody Transfer (Weights & Measures) |
| | Cable |
| 000 | No Cable |
| 101 | ASM CBL KIT 10Ft. ³ |
| 102 | ASM CBL KIT 20Ft. ³ |
| 103 | ASM CBL KIT 30Ft. ³ |
| 105 | ASM CBL KIT 50Ft. ³ |
| 110 | ASM CBL KIT 100Ft. ³ |
| | Electronics |
| O | No Electronics |
| D | For Use With Datamate |
| N | For use With Nexgen |
| ¹ Note: Wetted materials and connection materials must be the same. ² Note: The special 2" mating flanges to the MT truck accessories are no charge (N/C). ³ Note: For a complete list of available cables, contact factory. ⁴ Note: The 2" industrial and 2-1/2" 3A tri-clamp connections are available in 316L SS wetted materials only. | |

DIMENSIONAL DATA, mm (in.)

m100 Transducer



m200 3A-Authorized Transducer



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

WEIGHTS OF COMPONENTS

| | |
|------------------|---------------------------|
| Transducer: | approx. 26.4 kg (58 lbs) |
| Datamate: | approx. 6.6 kg (14 lbs) |
| NexGen: | |
| Blind | approx. 6.4 kg (14.1 lb.) |
| w/Display/keypad | approx. 7.1 kg (15.6 lb.) |

| CONNECTION | DIMENSIONS | |
|------------------------|------------------------------|--|
| | A 316L SS Wetted Parts | A ¹ HASTELLOY® C-22 Wetted Parts |
| 1" 150# ANSI RF | 688 (27.1) | 780 (30.7) |
| 1" 300# ANSI RF | 706 (27.8) | 780 (30.7) |
| 1" 600# ANSI RF | 719 (28.31) | 780 (30.7) |
| 1-1/2" 150# ANSI RF | 696 (27.4) | 780 (30.7) |
| 1-1/2" 300# ANSI RF | 714 (28.1) | 780 (30.7) |
| 1-1/2" 600# ANSI RF | 729 (28.69) | 780 (30.7) |
| 2" 150# ANSI RF | 704 (27.7) | 780 (30.7) |
| 2" 300# ANSI RF | 719 (28.3) | 780 (30.7) |
| 2" 600# ANSI RF | 738 (29.07) | 780 (30.7) |
| DN25 PN40 | 689 (27.14) | N/A |
| DN50 PN40 | 689 (27.14) | N/A |

¹All HASTELLOY® C-22 wetted parts dimensions are for lap-joint flanges.

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