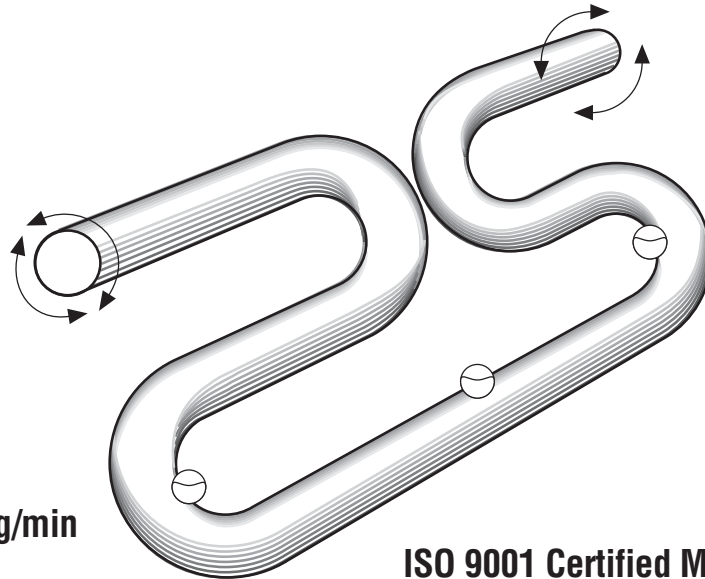


TS-605
Rev. C
Coriolis Mass Flowmeters
m200-XXXXXX



Coriolis Mass Flowmeters

Flow rate 14.5 to 1450 kg/min
(32 to 3200 lb/min)



ISO 9001 Certified Manufacturing Facility

SPECIFICATIONS

DESCRIPTION

The \dot{m} m200 provides accurate, continuous, direct measurement of mass, density, temperature and percent solids over the flow range 14.5 to 1450 kg/min (32 to 3200 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 m200 \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

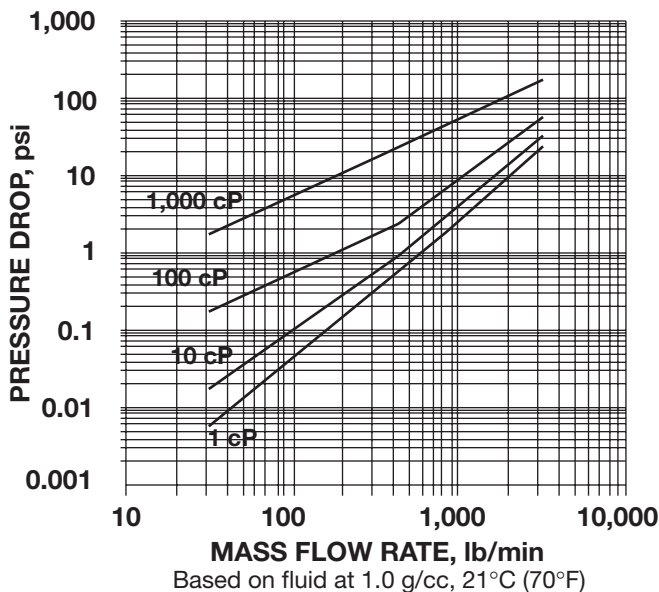
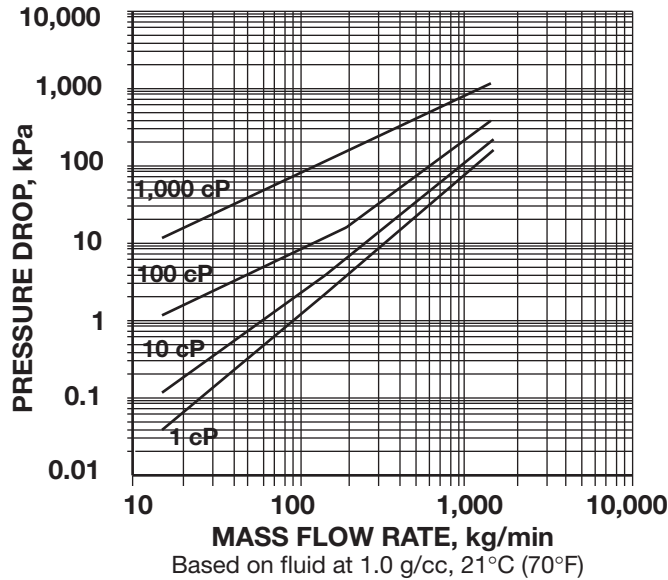
| Agency | Components | Method | Class | Div. Zone | Group | Temp. Class | Ambient Temp. |
|--------|------------|------------------|------------|-----------|-----------|-------------|---------------|
| CSA | Transducer | Intrinsic Safety | I, II, III | 1,2 | C,D,E,F,G | T5 | Note 1 |
| | Datamate |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

m200 OPERATING SPECIFICATIONS

| METERING ELEMENT | |
|--|---|
| Connections: Connection type | ANSI: 2", 3", 4"; 150#, 300#, 600# RF DIN: DN50, DN80, DN100; PN40, PN100 3A-Authorized: 4" Tri-Clamp® Industrial Tri-Clamp®: 3", 4" |
| 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 51 mm (2.0") 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: ±0.1901 kg/min (0.419 lb/min) NexGen SFT100: ±0.0557 kg/min (0.1228 lb/min) 100:1 0.4 to 2.0 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 | 14.5 to 1450 kg/min (32 to 3200 lb/min) 204°C (400°F) -45°C (-50°F) 68 bar (1000 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. M200 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 $\dot{m}^{\text{®}}$ accuracy for your selected flow rate:

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

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

where:

m = mass flow rate, kg/min or lb/min
 S₀ = mass zero stability, kg/min or lb/min for the m200 flowmeter

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

DETERMINING PRESSURE DROP

1. Flow rate vs. pressure drop varies with viscosity. To approximate m200 pressure drop for fluids with viscosity approximating that of water, locate the point on the 1-cP curve corresponding with your desired flow rate.
2. 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.
3. Divide the pressure drop indicated on the graph by the specific gravity (S) of the process fluid:

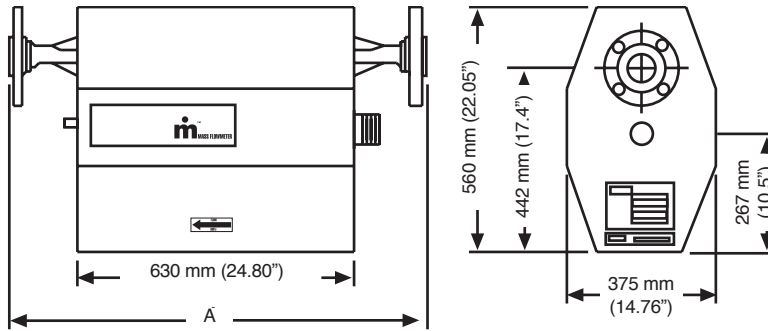
$$\Delta P_{\text{actual}} = \Delta P_{\text{plotted}} / \text{Sp. gr.}$$

m200 MASS FLOWMETER ORDERING INFORMATION

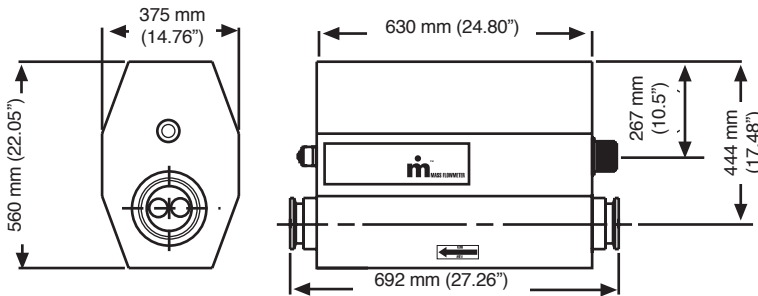
| MODEL NUMBER | | DESCRIPTION |
|---|--|--|
| M200 | X X X X X X | |
| | 2 8 S | Type Transducer 2" HastelloyA8 C-22 ¹ Transducer 2" SST ¹ Transducer 2" SST Sanitary Tri Clamp ¹ |
| | 000 252 272 273 852 853 862 863 866 872 873 8FE 8GE XXX | Flange 4" 3A SST Sanitary Tri Clamp ⁴ 2" 150lb. ANSI RF HastelloyA8 C-22 4" 150lb. ANSI RF HastelloyA8 C-22 4" 300lb. ANSI RF HastelloyA8 C-22 2" 150lb. ANSI RF SST 2" 300lb. ANSI RF SST 3" 150lb. ANSI RF SST 3" 300lb. ANSI RF SST 3" SST Industrial Tri Clamp ⁴ 4" 150lb. ANSI RF SST 4" 300lb. ANSI RF SST DN50 PN40 SST DN80 PN40 SST Special - Contact Factory ² |
| | 0 2 3 | Approvals General Purpose CSA LCIE |
| | 0 W | W & M None Custody Transfer (Weights & Measures) |
| | 000 101 102 103 105 110 | Cable No Cable ASM CBL KIT 10Ft. ³ ASM CBL KIT 20Ft. ³ ASM CBL KIT 30Ft. ³ ASM CBL KIT 50Ft. ³ ASM CBL KIT 100Ft. ³ |
| | O D N | Electronics No Electronics For Use With Datamate 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 3" or 4" industrial and 4" 3A tri-clamp connections are available in 316L SS wetted materials only. | | |
| General Note: A complete meter consists of a mass flow sensor (Transducer), a mass flow computer (Electronics) and sensor cable. | | |

DIMENSIONAL DATA, mm (in.)

m200 Transducer



m200 3A-Authorized Transducer



Optional 4" x 3" Tri-Clamp® eccentric reducers (P/N 101630-004) are available.

WEIGHTS OF COMPONENTS

| | |
|------------------|---------------------------|
| Transducer: | approx. 58.9 kg (130 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 |
| 2" 150# ANSI RF | 866 (34.1) | 979 (38.6) |
| 2" 300# ANSI RF | 881 (34.7) | 979 (38.6) |
| 2" 600# ANSI RF | 900 (35.45) | 979 (38.6) |
| 3" 150# ANSI RF | 876 (34.5) | 979 (38.6) |
| 3" 300# ANSI RF | 901 (35.48) | 979 (38.6) |
| 3" 600# ANSI RF | 919 (36.19) | 979 (38.6) |
| 4" 150# ANSI RF | 881 (34.7) | 979 (38.6) |
| 4" 300# ANSI RF | 912 (35.9) | 979 (38.6) |
| 4" 600# ANSI RF | 935 (36.81) | 979 (38.6) |
| DN50 PN40 | 861 (33.90) | N/A |
| DN80 PN40 | 861 (33.90) | N/A |
| DN100 PN40 | 860 (33.90) | N/A |

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

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