

Micro Motion[™] Technical Overview and Specification Summary



Micro Motion products

Emerson's world-leading Micro Motion Coriolis flow and density measurement devices have set the standard for superior measurement technology. Micro Motion offers the best measurement solutions for any process challenge.

Micro Motion advantages

Technology leadership

Micro Motion is committed to technology innovations that deliver the highest-performing solutions for your complex measurement challenges.

Widest breadth of products

Micro Motion has the widest range of flow and density measurement devices for virtually any process, application, or fluid. A wide variety of wetted materials, line sizes, and an extensive range of output options enable optimal system integration.

Unparalleled value

Benefit from expert field and technical application service and support made possible from more than one million meters installed worldwide and over 40 years of flow and density measurement experience.

Micro Motion Coriolis flow and density meters



ELITE

Peak performance Coriolis meter

- Ultimate real world performance
- Best fit-for-application
- Superior measurement confidence



F-Series

- High performance compact drainable Coriolis meter
- Best flow and density measurement in a compact, drainable flow meter
- Broadest range of application coverage
- Superior reliability and safety



T-Series

Straight tube full-bore Coriolis meter

- Superior flow measurement in a single straight tube flow meter
- Comprehensive hygienic application coverage
- Superior reliability

**R-Series**

General purpose flow and density Coriolis meter

- Simple to install and easy to use Coriolis flow measurement
- Broadest range of application coverage
- Superior reliability

**H-Series**

Hygienic compact drainable Coriolis meter

- Best flow and density measurement in a compact hygienic flow meter
- Comprehensive hygienic application coverage
- Exceptional reliability and safety

**LF-Series**

Extreme low-flow Coriolis meter

- Highest precision miniaturized flow meter
- Scalable platform for the most demanding low-flow applications
- Superior reliability

**CNG-Series**

Compressed Natural Gas (CNG) Coriolis meter

- Specifically designed for both light and heavy duty vehicle dispensers
- Custody transfer approved
- Compact design with no moving parts, special mounting, or flow conditioning required

**HPC-Series**

Ultra-High Pressure Flowmeter

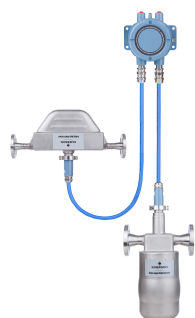
Global industry standard for ultra high pressure environments and hydrogen processing

- Coriolis mass flow meters designed for high pressure environments up to 15,000 psi (1,034.21 bar), such as chemical injection for the oil and gas industry and hydrogen dispensing
- Micro Motion MVD™ Direct Connect™ technology for space and weight savings
- Variety of transmitter options provide multivariable outputs to accommodate any design requirements

**TA-Series**

Tantalum-Series Flow and Density Meters

- Ideal for handling corrosive fluids, such as acids and bases
- Exceptional reliability and safety

**LNG-Series**

Global industry standard for liquified natural gas dispensing system

- Provides total LNG mass balance by measuring both the liquid supply and return boil off gas
- Works along with the 820 dual core processor for a built in barrier and custody lockout switch
- Measures two Coriolis flow meters with a single electronic package

Flow and density meter specifications

Table 1: Application type

Sensor	Continuous control	Batching / loading / blending	Custody transfer
ELITE	•	•	•
F-Series	•	•	•
T-Series	•	•	
R-Series	•	•	
H-Series	•	•	•
LF-Series	•	•	
CNG-Series	•	•	•
HPC-Series	•	•	
TA-Series	•	•	
LNG-Series	•	•	•

• Supported on all models • Supported on some models

Table 2: Measurement accuracy

Sensor	Liquid mass flow	Liquid density	Liquid volume flow	Gas mass flow
ELITE	±0.05%	±0.2 kg/m ³ (±0.0002 g/cm ³)	±0.05%	±0.25%
F-Series	±0.05%	±0.5 kg/m ³ (±0.0005 g/cm ³)	±0.05%	±0.35%
T-Series	±0.1%	±0.5 kg/m ³ (±0.0005 g/cm ³)	±0.15%	±0.50%
R-Series	±0.40%	±3 kg/m ³ (±0.003 g/cm ³)	±0.40%	±0.75%
H-Series	±0.05%	±0.5 kg/m ³ (±0.0005 g/cm ³)	±0.05%	±0.35%
LF-Series	±0.50%	±5 kg/m ³ (±0.005 g/cm ³)		±0.50%
CNG-Series		n/a	n/a	±0.50%
HPC-Series	±0.1%	±1 kg/m ³ (±0.001 g/cm ³)	±0.15%	±0.50%
TA-Series	±0.1%	±1 kg/m ³ (±0.001 g/cm ³)	±0.10%	n/a

Table 2: Measurement accuracy (continued)

Sensor	Liquid mass flow	Liquid density	Liquid volume flow	Gas mass flow
LNG-Series	±0.5%	n/a	n/a	±0.50%

Table 3: Capabilities

Sensor	Self-draining	Sanitary / hygienic	2-phase flow / entrained gas	Smart Meter Verification	High temperatur e	High pressure	Cryogenic
ELITE	●	●	•	•	●	●	●
F-Series	•		•	•	●	●	●
T-Series	•	•		•			
R-Series	•			•		●	
H-Series	•	•	•	•			
LF-Series							
CNG-Series	•					•	
HPC-Series	•			•		•	
TA-Series	●			•			
LNG-Series	•						•

• Supported on all models ● Supported on some models

Table 4: Wetted materials

Sensor	300-Series stainless steel	Super Duplex	Nickel Alloy C22	Titanium	Tantalum
ELITE	•	●	•		
F-Series	•		●		
T-Series				•	
R-Series	•				
H-Series	•				
LF-Series	•				
CNG-Series	•				
HPC-Series	•		●		
TA-Series					•
LNG-Series	•				

• Supported on all models ● Supported on some models

Table 5: Fits nominal line sizes

Sensor	Inches	Millimeters
ELITE	1/14 - 14	1 - 350
F-Series	1/4 - 4	8 - 100
T-Series	1/4 - 2	8 - 50

Table 5: Fits nominal line sizes (*continued*)

Sensor	Inches	Millimeters
R-Series	1/4 - 3	8 - 80
H-Series	1/4 - 4	8 - 100
LF-Series	1/32 - 1/4	0.8 - 8
CNG-Series	1/2 - 3/4	15 - 20
HPC-Series	1/10 - 3/4	3 - 20
TA-Series	1/10 - 3	3 - 80
LNG-Series	1/4 - 1	6 - 25

Micro Motion transmitters and controllers



5700

Advanced field-mount transmitter

- Integral and remote mount options
- Wide variety of I/O and application capabilities to fit your needs
- Large graphical display
- Real time data logging and storage
- Smart Meter Verification Professional enables non-uniform coating detection, installation verification, multiphase diagnostic, and flow range diagnostic
- Available with full stainless steel housing for harsh environments



4200

2-wire transmitter

- Integral and remote mount options
- Compact, 2-wire transmitter design saves electrical cost for use on integrated systems and skids
- Large graphical display
- Certified for SIL2 and SIL3 Safety applications per IEC 61508



1600

- Compact transmitter
 - Optional Power over Ethernet reduces wiring cost and effort
 - Native Ethernet allows for ease of integration
- Integral and remote mount options
- Includes additional configurable channel
- Large graphical display
- Wide variety of enhanced application solutions to fit your needs
- Available in aluminum and hygienic stainless steel



1500/2500

Compact control-room transmitter

- DIN rail mount with flexible installation options
- Wide variety of I/O and application capabilities to fit your needs



1700/2700

Versatile field-mount transmitter

- Integral and remote mount options
- Wide variety of I/O and application capabilities to fit your needs
- Available with full stainless steel housing for harsh environments



2400S

Compact integral transmitter

- Simple I/O options
- Offers powerful diagnostics like Smart Meter Verification in a condensed form factor
- Hygienic, stainless steel housing available



3300

Rack/panel mount discrete controller

3500

Rack/panel mount transmitter with discrete controller



3350

Field mount discrete controller

3700

Field mount transmitter with discrete controller



EtherNet I/P Module

- Access all process variables and diagnostics
- Simple EtherNet integration and retrofit



FMT

Compact filling and dosing transmitter

- Easy-to-clean, hygienic design that enables SIP/CIP
- Highest accuracy and fast response time

Transmitter and controller specifications

Output variables

Transmitter	Mass / volume flow	Net product content / flow (optional) ⁽¹⁾	Temperature	Density	Concentration (optional)
1500	•				
1600	•	•	•	•	•
1700	•				
2400S	•	•	•	•	•
2500	•	•	•	•	•
2700	•	•	•	•	•
3300					
3350					
3500	•	•	•	•	•
3700	•	•	•	•	•
4200	•	•	•	•	•
5700	•	•	•	•	•
FMT	•		•	•	
• Supported on all models					

(1) Flow rate of product based on concentration. For example, in a dissolved sugar solution, the measurement is the flow rate of the sugar alone, and in a net oil application, the measurement is water alone or oil alone.

Local display

Transmitter	2-line	Graphical
1500		
1600		•
1700	•	
2400S	•	
2500		
2700	•	
3300		•
3350		•
3500		•
3700		•
4200		•
5700		•
FMT		
• Supported on all models		

Power

Transmitter	AC	DC	Loop powered (2-wire)	Power over Ethernet (PoE)
1500		•		
1600		•		•
1700	•	•		
2400S	•	•		
2500		•		
2700	•	•		
3300	•	•		
3350	•	•		
3500	•	•		
3700	•	•		
4200			•	
5700	•	•		
FMT		•		

• Supported on all models.

Outputs

Transmitter	4–20 mA	10 kHz pulse	Discrete	HART® (1)	Modbus®	FOUNDATION™ fieldbus	DeviceNet™	PROFIBUS- PA	PROFIBUS- DP
1500	•	•	•	•	•				
1600	•	•	•						
1700	•	•	•	•	•				
2400S	•	•	•	•			•		•
2500	•	•	•	•	•				
2700	•	•	•	•	•	•		•	
3300			•		•				
3350			•		•				
3500	•	•	•	•	•				
3700	•	•	•	•	•				
4200	•	•	•	•					
5700	•	•	•	•	•	•		•	
FMT	•	•	•		•				•

• Supported on all models, although some combinations may be unavailable.

(1) HART or WirelessHART®

Ethernet outputs

Transmitter	EtherNet/IP	PROFINET	Modbus TCP
1500	● ⁽¹⁾⁽²⁾		
1600	● ⁽³⁾		•
1700	● ⁽¹⁾		
2400S			
2500	● ⁽¹⁾		
2700	● ⁽¹⁾		
3300			
3350			
3500	● ⁽¹⁾⁽²⁾		
3700	•		
4200			
5700	● ⁽³⁾	•	•
FMT			
• Supported on all models ● Supported on some models			

(1) With use of the Micro Motion EtherNet/IP module.

(2) 1500 fast fill and both 3500 and 3700 batching are not supported by the EtherNet/IP module.

(3) 1600 and 5700 transmitters are not compatible with EtherNet/IP module.

Inputs

Transmitter	10 kHz pulse	Discrete	4–20 mA	HART ⁽¹⁾	4-wire remote sensor	9-wire remote sensor
1500				•	•	•
1700				•	•	•
2400S		•		•		
2500		•		•	•	•
2700		•		•	•	•
3300	•	•				
3350	•	•				
3500		•		•	•	•
3700		•		•	•	•
4200				•		•
5700		•	•	•	•	•
FMT		•				
• Supported on all models, although some combinations may be unavailable.						

(1) HART or WirelessHART

Transmitter and sensor pairing

Sensor	1500/2500	1600	1700/2700	2200S	2400S	3000	4200	5700	FMT
ELITE	•	•	•	•	•	•	•	•	CMFS only
ELITE high capacity	•	•	•		•	•		•	
F-Series	•	•	•	•	•	•	•	•	0.25 in (6 mm) 0.5 in (13 mm) 1 in (25 mm)
H-Series	•	•	•	•	•	•	•	•	0.25 in (6 mm) 0.5 in (13 mm) 1 in (25 mm)
R-Series	•	•	•		•	•	•	•	
T-Series	•	•	•		•	•	•	•	
TA-Series (Tantalum)								• ⁽¹⁾	
CNG050	•		•			•			
HPC-Series	•	•	•	•	•		•	•	

(1) Remote 5700.

A sensor and transmitter compatibility list is also available at www.emerson.com/en-us/automation/brands/micro-motion/charts.

Mounting

Transmitter	Integral - field aluminum	Integral - field stainless steel	Remote - field aluminum	Remote - field stainless steel	Remote - control room	Remote - rack / panel mount
1500					•	
1600	•	•	•			
1700	•		•	•		
2400S	•	•				
2500					•	
2700	•		•	•		
3300					•	•
3350			•			
3500					•	•
3700			•			
4200	•		•			
5700	•		•	•		
FMT		•				

• Supported on all models, although some combinations may be unavailable.

Special application type

Transmitter	Batch controller	Custody transfer	2-phase flow / entrained gas	Filling & dosing	Smart Meter Verification	SIS certified
1500			•	•	•	
1600	•	•	•		•	
1700			•		•	•
2400S			•		•	
2500			•		•	
2700		•	•		•	•
3300	•	•				
3350	•	•				
3500	•	•	•		•	
3700	•	•	•		•	
4200					•	•
5700	•	•	•		•	•
FMT				•		
• Supported on all models						

Hazardous approvals

Transmitter	C1D1	C1D2	Zone 1	Zone 2
1500		• ⁽¹⁾		•
1600		•		•
1700	•	•	•	•
2400S		•		•
2500		• ⁽¹⁾		•
2700	•	•	•	•
3300		• ⁽¹⁾		
3350		•	•	•
3500		• ⁽¹⁾		
3700		•	•	•
4200	•	•	•	•
5700	•	•	•	•
FMT		•		•
• Supported on all models				

(1) When installed in a suitable enclosure.

Smart Meter Verification

Smart Meter Verification works with the following sensors:

- CMFS
- CMF

- F-Series
- H-Series
- R-Series
- T-Series
- TA-Series
- HPC-Series

Table 6: Smart Meter Verification capabilities

	Basic	Professional	
	Included	Licensed	90-day trial, licensed
Access			
Sensor compatibility ⁽¹⁾	CMFS, CMF, F, H, R, T, TA, and HPC		
Transmitter compatibility ⁽¹⁾	Direct Connect, 1500, 1600, 1700, 2400S, 2500, 2700, Series 3000, 4200, 5700	Direct Connect, 1500, 1600, 1700, 2400S, 2500, 2700, Series 3000, 4200	1600, 5700
Calibration coefficients audit	•	•	•
Zero audit	•	•	•
Electronics verification	•	•	•
Automatic test scheduler	•	•	•
History of previous 20 results		•	•
Verification report		• ⁽²⁾	• ⁽²⁾
Non-uniform coating diagnostic			•
Multiphase diagnostic			• ⁽³⁾
Flow range diagnostic			• ⁽³⁾

(1) Enhanced core processor only.

(2) To generate a test report (for a report to exist), the test host must be ProLink III Basic or Professional, web page (Ethernet devices), or AMS SMV SNAP-ON. To generate previous test reports (for previous reports to exist), the test host must have been ProLink III Basic or Professional, and the same PC that ran the test must be used. You can view results for all tests that are in the PC database.

(3) 24-hour historical visualization using ProLink III Professional.

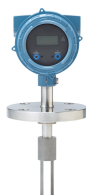
Micro Motion density and viscosity meters



CDM

Peak performance precision density meter

- Accredited, traceable density measurement
- Superior multi-variable I/O, meter health, and application capabilities
- Installation flexibility and compatibility

**FDM**

Direct insertion density meter

- Rugged, accurate density, temperature, and concentration measurement
- Superior multi-variable I/O, meter health, and application capabilities
- Installation flexibility and compatibility

**FVM**

High performance multi-variable viscosity meter

- Rugged, accurate multi-variable measurement
- Superior multi-variable I/O, meter health, and application capabilities
- Installation flexibility and compatibility

**HFVM**

High performance multi-variable viscosity meter

- World-wide marine-approved design for aggressive environments
- Durable Diamond-Like Carbon (DLC) coating that is resistant to friction, chemicals, impact, and mechanical damage

**GDM**

Fiscal gas density meter

- Accredited, traceable density measurement
- Superior multi-variable I/O, meter health, and application capabilities
- Installation flexibility and compatibility

**SGM**

Gas specific gravity and gas energy meter

- Precision gas specific gravity measurement
- Superior multi-variable I/O, meter health, and application capabilities
- installation flexibility and compatibility

Density meter specifications

Table 7: Application type for liquid meters

Meter	Continuous control	Batching / loading / blending	Custody transfer	High consistency slurry	Viscosity control	Combustion control
CDM	•	•	•			
FDM	•	•		•		
FVM	•	•			•	•
HFVM	•	•			•	•
• Supported on all models						

Table 8: Application type for gas meters

Meter	Continuous control	Batching / loading / blending	Custody transfer	Combustion control
GDM	•	•	•	•
SGM	•	•	•	•
• Supported on all models				

Table 9: Measurement accuracy for liquid meters

Meter	Liquid & slurry density ⁽¹⁾	Liquid & slurry velocity	Liquid viscosity
CDM	±0.1 kg/m ³ (±0.0001 g/cm ³)	Available as diagnostic	
FDM	±1 kg/m ³ (±0.001 g/cm ³)		
FVM	±1 kg/m ³ (±0.001 g/cm ³)		±0.2 cP for 0.5-10 cP range 1% full scale above 10 cP
HFVM	±1 kg/m ³ (±0.001 g/cm ³)		±0.2 cP for 0.5-10 cP range 1% full scale above 10 cP

(1) Accuracy specifications shown are best possible. Specific models, options, or process/operating conditions may result in a less accurate specifications.

Table 10: Measurement accuracy for gas meters

Meter	Gas density or gas-specific gravity
GDM	±0.1% or ±0.15% of density reading
SGM	Up to 0.1% of specific gravity reading

Table 11: Capabilities of liquid meters

Meter	Self-draining	Velocity indication	Known Density Verification	High pressure
CDM	•	•	•	•
FDM	•		•	•
FVM	•		•	•
HFVM	•		•	•
• Supported on all models • Supported on some models				

Table 12: Capabilities of gas meters

Meter	High pressure	Known Density Verification
GDM	•	•
SGM	•	•
• Supported on all models • Supported on some models		

Table 13: Wetted materials for liquid meters

Meter	300 series stainless steel	Nickel alloy C22	Titanium	Zirconium
CDM	•	•		
FDM	•	•	•	•
FVM	•			
HFVM	•			
• Supported on all models ◐ Supported on some models				

Table 14: Wetted materials for gas meters

Meter	300 series stainless steel	Aluminum	Ni-span-C
GDM	•		•
SGM	•	•	•
• Supported on all models ◐ Supported on some models			

Table 15: Outputs for liquid meters

Meter	Time Period Signal	Analog	HART / wireless HART	RS-485 Modbus	2-line display	FOUNDATION fieldbus
CDM	◐	◐	◐	◐	◐	◐
FDM	◐	•	•	•	◐	◐
FVM		•	•	•	◐	◐
HFVM		•	•	•	◐	
• Supported on all models ◐ Supported on some models						

Table 16: Outputs for gas meters

Meter	Time Period Signal	Analog	HART / wireless HART	RS-485 Modbus	2-line display	FOUNDATION fieldbus
GDM	◐	◐	◐	◐	◐	◐
SGM	•	•	•	•	•	◐
• Supported on all models ◐ Supported on some models						

Table 17: Output variables for liquid meters

Model	Density	Temperature	Concentration	Velocity	Viscosity / referred viscosity	Mass / net product flow
CDM	•	•	•	•		
FDM	•	•	•			• ⁽¹⁾
FVM	•	•	•		•	• ⁽¹⁾
HFVM	•	•	•		•	
• Supported on all models						

(1) When connected to a volumetric flowmeter

Table 18: Output variables for gas meters

Model	Density	Temperature	Concentration	Gas specific gravity / BTU / Wobbe index	Mass / net product flow
GDM	•	•	•	•	• ⁽¹⁾
SGM		•	•	•	• ⁽¹⁾
• Supported on all models					

(1) When connected to a volumetric flowmeter

Table 19: Mounting for liquid meters

Meter	Integral-field
CDM	•
FDM	•
FVM	•
HFVM	•
• Supported on all models	

Table 20: Gas meter mounting

Meter	Integral-field
GDM	•
SGM	•
• Supported on all models	

Table 21: Hazardous area approvals for liquid meters

Meter	ATEX / IECEx IIC Zone 1	ATEX / IECEx IIC Zone 2	CSA C-US C1D1	CSA C-US C1D2
CDM	ⓘ	•	ⓘ	•
FDM	ⓘ	•	ⓘ	•
FVM	ⓘ	•	ⓘ	•
HFVM	ⓘ	•	ⓘ	•
• Supported on all models ⓘ Supported on some models				

Table 22: Hazardous area approvals for gas meters

Meter	ATEX / IECEx IIC Zone 1	ATEX / IECEx IIC Zone 2	CSA C-US C1D1	CSA C-US C1D2
GDM	•		•	
SGM	•		•	
• Supported on all models				

Table 23: Nominal sizes for liquid meters

Meter	Inches	Millimeters
CDM	1	25
FDM	1 or larger	25 or larger

Table 23: Nominal sizes for liquid meters (*continued*)

Meter	Inches	Millimeters
FVM	1 or larger	25 or larger
HFVM	1 or larger	25 or larger

Table 24: Nominal sizes for gas meters

Meter	Inches	Millimeters
GDM	1/4 or larger	6 or larger
SGM	1/4 or larger	6 or larger

Performance specifications

Reference operating conditions

For determining the performance capabilities of our meters, the following conditions were observed/used:

- Water at 68 °F (20.0 °C) to 77 °F (25.0 °C) and 14.5 psig (1.000 barg) to 29 psig (2.00 barg)
- Air and Natural Gas at 68 °F (20.0 °C) to 77 °F (25.0 °C) and 500 psig (34.47 barg) to 1,450 psig (99.97 barg)
- Accuracy is verified by industry leading accredited calibration stands according to ISO 17025

Accuracy and repeatability on liquids and slurries

Sensor	Accuracy ⁽¹⁾		Mass/volume flow repeatability
	Mass flow ⁽²⁾	Volume flow ⁽²⁾	
ELITE	±0.05%	±0.05%	±0.025%
F-Series	±0.05%	±0.05%	±0.025%
HPC-Series	±0.20%	±0.20%	±0.10%
H-Series	±0.05%	±0.05%	±0.025%
LF-Series	±0.50%	±0.50%	±0.05%
LNG-Series	±0.50%	n/a	±0.25%
R-Series	±0.40%	±0.4%	±0.20%
TA-Series	±0.10%	±0.10%	±0.05%
T-Series	±0.15%	±0.25%	±0.05%

(1) Flow rate accuracies are base percentages. For total accuracy see [Measurement accuracy for liquid meters](#). Stated accuracy includes the combined effects of repeatability, linearity, and hysteresis.

(2) Flow rate accuracies may vary with calibration option selected. Consult the sensor Product Data Sheet for details.

Accuracy and repeatability on gases

Sensor	Accuracy ⁽¹⁾	Repeatability
CNG-Series	±0.50% of rate	±0.25% of rate

Sensor	Accuracy ⁽¹⁾	Repeatability
ELITE	±0.25% of rate	±0.20% of rate
F-Series	±0.35% of rate	±0.25% of rate
HPC-Series	±0.50% of rate	±0.25% of rate
H-Series	±0.35% of rate	±0.25% of rate
LF-Series	±0.50% of rate	±0.05% of rate ⁽²⁾
LNG-Series	±0.50% of rate	±0.25% of rate
R-Series	±0.75% of rate	±0.5% of rate
T-Series	±0.50% of rate	±0.05% of rate

(1) Flow accuracies are base percentages. For total accuracy see [Table 10](#). Stated accuracy includes the combined effects of repeatability, linearity, and hysteresis.

(2) ±0.05% of rate or 1/2[(zero stability/flow rate) x 100]% of flow rate, whichever is greater.

Liquid flow rates

Family	Model	Nominal line size		Maximum flow rate			
		inch	mm	lb/min	gal/min	kg/h	l/h
CDM	CDM100	1	DN25	625	75	17,000	17,000
ELITE	CMFS007	1/12	DN1	1.50	0.180	40.9	40.9
	CMFS010	1/10	DN2	4.03	0.484	110	110
	CMFS015	1/6	DN3	12.1	1.45	330	330
	CMFS025	1/4	DN6	77.0	9.23	2,100	2,100
	CMFS040	3/8	DN10	170	20.4	4,640	4,640
	CMFS050	1/2	DN15	250	30.0	6,820	6,820
	CMFS075	3/4	DN20	460	55.2	12,500	12,500
	CMFS100	1	DN25	950	114	25,900	25,900
	CMFS150	1 1/2	DN40	1,980	237	54,000	54,000
	CMF010	1/10	DN2	3.96	0.475	108	108
	CMF025	1/4	DN6	79.9	9.58	2,180	2,180
	CMF050	1/2	DN15	249	29.9	6,800	6,800
	CMF100	1	DN25	997	120	27,200	27,200
	CMF200	2	DN50	3,190	383	87,100	87,100
	CMF300	3	DN80	9,970	1,200	272,000	272,000
	CMF350	4	DN100	15,000	1,800	409,000	409,000
	CMF400	6	DN150	20,000	2,400	545,000	545,000
	CMFHC2	8	DN200	54,000	6,440	1,470,000	1,470,000
	CMFHC3	10	DN250	94,000	11,227	2,550,000	2,550,000
	CMFHC4	12	DN300	120,000	14,350	3,266,000	3,266,000

Family	Model	Nominal line size		Maximum flow rate			
		inch	mm	lb/min	gal/min	kg/h	l/h
F-Series	F025	1/4	DN6	100	12	2,720	2,720
	F050	1/2	DN15	300	36	8,160	8,160
	F100	1	DN25	1,200	144	32,650	32,650
	F200	2	DN50	3,200	384	87,100	87,100
	F300	3	DN80	8,744	1,047	238,499	238,499
	F400	4	DN100	16,000	1,916	436,000	436,000
FDM, FVM, HFVM		Line sizes and flow rates are installation-dependent. Contact your sales representative.					
HPC-Series	HPC010	1/8	DN6	8.8	0.22	240	240
	HPC015	1/8	DN6	18.5	2.26	504	504
H-Series	H025	1/4	DN6	76	9	2,068	2,068
	H050	1/2	DN15	180	22	4,900	4,900
	H100	1	DN25	820	98	22,320	22,320
	H200	2	DN50	2,350	282	63,960	63,960
	H300	3	DN80	8,744	1,047	238,499	238,499
	H400	4	DN100	16,000	1,916	436,000	436,000
LF-Series	LF2M	1/32	DN1	0.014	0.0017	0.38	0.38
	LF3M	1/16	DN2	0.037	0.0043	1.00	1.00
	LF4M	1/8	DN3	0.992	0.119	27.00	27.00
LNG-Series	LNGM10S	1	DN25	661	18,000	n/a	n/a
R-Series	R025	1/4	DN6	100	12	2,720	2,720
	R050	1/2	DN15	300	36	8,160	8,160
	R100	1	DN25	1,200	144	32,650	32,650
	R200	2	DN50	3,200	384	87,100	87,100
	R300	3	DN80	8,744	1,047	238,499	238,499
T-Series	T025	1/4	DN6	25	3	680	680
	T050	1/2	DN15	140	17	3,800	3,800
	T075	3/4	DN20	500	60	14,000	14,000
	T100	1	DN25	1,100	132	30,000	30,000
	T150	1 1/2	DN40	3,200	384	87,000	87,000
TA-Series	TA010T	1/10	DN6	12.9	1.5	350	350
	TA025T	1/4	DN8	44.1	5.3	1,200	1,200
	TA050T	1/2	DN15	110.2	13.2	3,000	3,000
	TA075T	3/4	DN20	220.5	26.5	6,000	6,000
	TA100T	1	DN25	661.4	79.4	18,000	18,000
	TA200T	2	DN50	1102.3	132.3	30,000	30,000
	TA300T	3	DN80	2,939.5	352.2	80,000	80,000

Gas flow rates

When selecting sensors for gas applications, pressure drop through the sensor is dependent upon operating temperature, pressure, and fluid composition. Therefore, when selecting a sensor for any particular gas application, it is highly recommended that each sensor be sized using the Sizing and Selection Tool for detailed information regarding performance and sizing of the meters.

Gas flow rates for Coriolis meters (except T-Series)

Use the following equation to determine general recommendations on nominal and maximum gas mass flow rates:

$$\dot{m}_{(gas)} = \%M * \rho_{(gas)} * VOS * \frac{1}{4} \pi * D^2 * 2 \text{ (for sensors with dual-tube design)}$$

$\dot{m}_{(gas)}$	Gas mass flow rate
$\%M$	Use Mach number "0.2" for calculating typical nominal flow rate; use Mach number "0.3" for calculating maximum recommended rate. When Mach Numbers are above 0.3, most gas flows become compressible and significant increases in pressure drop may occur regardless of measurement device.
$\rho_{(gas)}$	Gas density at operating conditions
VOS	Velocity of Sound of the measured gas
D	Internal diameter of the measuring tube

Note

Gas maximum flow rate can never be greater than the maximum liquid rate. Assume that the lower of the two rates is applicable.

Gas flow rates for T-Series meters

Model	Mass		Volume	
	lb/min	kg/h	SCFM	Nm ³ /h
T025	2.8	76	64	100
T050	20	540	460	780
T075	75	2,000	1,700	2,800
T100	160	4,300	3,700	6,300
T150	400	10,000	9,500	16,000

Standard (SCFM) reference conditions for natural gas with molecular weight of 17 are 14.7 psig (1.014 barg) and 60 °F (15.6 °C).

Gas flow rates for GDM and SGM

Meter	SCFM	Nm ³ /h	l/h
GDM	0.0059	0.01	10
SGM	0.0412	0.07	70

Standard (SCFM) reference conditions are 14.7 psig (1.014 barg) and 60 °F (15.6 °C).

Liquid density accuracy and repeatability

Note

Meters not listed in the liquid density table are not designed to measure liquid density.

Family	Accuracy	Repeatability
CDM	$\pm 0.1 \text{ kg/m}^3 (\pm 0.0001 \text{ g/cm}^3)$	$\pm 0.02 \text{ kg/m}^3 (\pm 0.00002 \text{ g/cm}^3)$
ELITE	$\pm 0.2 \text{ kg/m}^3 (\pm 0.0002 \text{ g/cm}^3)$	$\pm 0.1 \text{ kg/m}^3 (\pm 0.0001 \text{ g/cm}^3)$
FDM	$\pm 1 \text{ kg/m}^3 (\pm 0.001 \text{ g/cm}^3)$	$\pm 0.1 \text{ kg/m}^3 (\pm 0.0001 \text{ g/cm}^3)$
F-Series	$\pm 0.5 \text{ kg/m}^3 (\pm 0.0005 \text{ g/cm}^3)$	$\pm 0.2 \text{ kg/m}^3 (\pm 0.0002 \text{ g/cm}^3)$
FVM	$\pm 1 \text{ kg/m}^3 (\pm 0.001 \text{ g/cm}^3)$	$\pm 0.1 \text{ kg/m}^3 (\pm 0.0001 \text{ g/cm}^3)$
HFVM	$\pm 1 \text{ kg/m}^3 (\pm 0.001 \text{ g/cm}^3)$	$\pm 0.1 \text{ kg/m}^3 (\pm 0.0001 \text{ g/cm}^3)$
HPC-Series	$\pm 1 \text{ kg/m}^3 (\pm 0.001 \text{ g/cm}^3)$	$\pm 0.5 \text{ kg/m}^3 (\pm 0.0005 \text{ g/cm}^3)$
H-Series	$\pm 0.5 \text{ kg/m}^3 (\pm 0.0005 \text{ g/cm}^3)$	$\pm 0.2 \text{ kg/m}^3 (\pm 0.0002 \text{ g/cm}^3)$
LF-Series	$\pm 5 \text{ kg/m}^3 (\pm 0.005 \text{ g/cm}^3)$	$\pm 2 \text{ kg/m}^3 (\pm 0.002 \text{ g/cm}^3)$
R-Series	$\pm 3 \text{ kg/m}^3 (\pm 0.003 \text{ g/cm}^3)$	$\pm 1.5 \text{ kg/m}^3 (\pm 0.0015 \text{ g/cm}^3)$
TA-Series	$\pm 1 \text{ kg/m}^3 (\pm 0.001 \text{ g/cm}^3)$	$\pm 0.5 \text{ kg/m}^3 (\pm 0.0005 \text{ g/cm}^3)$
T-Series	$\pm 2 \text{ kg/m}^3 (\pm 0.002 \text{ g/cm}^3)$	$\pm 0.5 \text{ kg/m}^3 (\pm 0.0005 \text{ g/cm}^3)$

Gas density/specific gravity accuracy and repeatability

Note

Meters not listed in the gas density/specific gravity table are not designed to measure gas density/specific gravity.

Meter	Accuracy	Repeatability
GDM	$\pm 0.1\%$ of reading	0.02% of reading
SGM	Up to $\pm 0.1\%$	0.02% of reading

Temperature accuracy

Family	Temperature accuracy
CDM	BS1904 Class, DIN 43760 Class A ($\pm 0.15 + 0.002 \times \text{Temp C}$)
ELITE	1°C $\pm 0.5\%$ of reading
FDM	BS1904 Class, DIN 43760 Class B ($\pm 0.30 + 0.005T$)
F-Series	1°C $\pm 0.5\%$ of reading
FVM	BS1904 Class, DIN 43760 Class B ($\pm 0.30 + 0.005T$)
GDM	IEC60751 Class A C= ($\pm 0.15 + 0.002T$) RTD
HFVM	BS1904 Class, DIN 43760 Class B ($\pm 0.30 + 0.005T$)
HPC-Series	1°C $\pm 0.5\%$ of reading
H-Series	1°C $\pm 0.5\%$ of reading
LF-Series	$\pm 0.5 \text{ C}$
LNG-Series	$\pm 1.0 \text{ }^\circ\text{C} \pm 0.5\%$ of reading (process temperature range $-100 \text{ }^\circ\text{C}$ to $+60 \text{ }^\circ\text{C}$) $\pm 1.0 \text{ }^\circ\text{C} \pm 1.0\%$ of reading (process temperature range $-196 \text{ }^\circ\text{C}$ to $-100 \text{ }^\circ\text{C}$)
R-Series	1°C $\pm 0.5\%$ of reading
SGM	IEC60751 Class A C= ($\pm 0.15 + 0.002T$) RTD

Family	Temperature accuracy
TA-Series	$\pm 1.5\text{ }^{\circ}\text{C} \pm 0.5\%$ of reading
T-Series	$1^{\circ}\text{C} \pm 0.5\%$ of reading

Viscosity accuracy and repeatability

Meter	Viscosity calibrated range	Maximum viscosity operating range	Accuracy	Repeatability
FVM	0.5 to 12,500 cP	0.5 to 20,000 cP (using up to four calibrated ranges)	± 0.2 cP over the 0.5-10 cP range, and then 1% full scale of the operating calibrated range	0.5% of reading
HFVM	0.5 to 100 cP	0.5 to 100 cP (using up to two calibrated ranges)	± 0.2 cP over the 0.5-10 cP range, and then 1% full scale of the operating calibrated range	0.5% of reading

Temperature rating

Family	Model	Temperature ⁽¹⁾
CNG-Series	CNG050	-40 °F (-40 °C) to 257 °F (125 °C)
ELITE	Standard models	-400 °F (-240 °C) to 400 °F (204 °C)
	High-temperature models	-58 °F (-50 °C) to 662 °F (350 °C)
	CMFS models	-58 °F (-50 °C) to 400 °F (204 °C)
	Super Duplex models ⁽²⁾	-40 °F (-40 °C) to 400 °F (204 °C)
F-Series	Standard models	-148 °F (-100 °C) to 400 °F (204 °C)
	High-temperature models	-40 °F (-40 °C) to 662 °F (350 °C)
HPC-Series	HPC010	-58 °F (-50 °C) to 257 °F (125 °C)
	HPC015	-50.8 °F (-46 °C) to 392 °F (200 °C)
H-Series	All models	-148 °F (-100 °C) to 400 °F (204 °C)
LF-Series	All models	32 °F (0 °C) to -149 °F (-101 °C)
LNG-Series	All models	-320 °F (-196 °C) to 140 °F (60 °C)
R-Series	All models	-58 °F (-50 °C) to 302 °F (150 °C)
T-Series	All models	-60 °F (-51 °C) to 302 °F (150 °C)
TA-Series	All models	-40 °F (-40 °C) to 356 °F (180 °C)
CDM/FDM/FVM/HFVM	All models	-58 °F (-50 °C) to 392 °F (200 °C)
GDM		0 °F (-18 °C) to 257 °F (125 °C)
SGM		0 °F (-18 °C) to 122 °F (50 °C)

(1) Temperature rating may be affected by electronics, hazardous area classification, and/or ambient temperature.

(2) Applications between 350 °F (177 °C) and 400 °F (204 °C) must be approved by Micro Motion metallurgy.

Process pressure ratings

Sensor maximum working pressure reflects the highest possible pressure rating for a given meter. Selection of process fitting as well as environmental and process fluid temperatures may reduce this maximum rating. Refer to the technical data sheet or contact the factory directly for detailed sensor pressure rating charts with corresponding de ratings for specific process fittings over a range of temperatures.

All sensors comply with ASME B31.3 piping code and council directive 97/23/EC of 29 May 1997 on Pressure Equipment.

Sensor maximum working pressure

Family	Model	Wetted material	Pressure
CNG-Series	CNG050	Stainless steel	5,000 psig (344.74 barg)
ELITE	Standard models	Stainless steel	1,450 psig (99.97 barg) - 1,812 psig (124.93 barg) ⁽¹⁾
		Nickel alloy C22 (N06022)	2,465 psig (169.96 barg) - 3,626 psig (250.00 barg)
	CMFS010P CMFS010H CMFS015P CMFS015H CMF010P	Nickel alloy C22 (N06022) ⁽²⁾	6,000 psig (413.69 barg)
	CMF400P	Nickel alloy C22 (N06022)	2,973 psig (204.98 barg)
	CMFHC2Y CMFHC3Y	Super Duplex	2,320 psig (159.96 barg)
F-Series	Standard models	Stainless steel	1,450 psig (99.97 barg)
		Nickel alloy C22 (N06022)	2,160 psig (148.93 barg)
	F025P	Stainless steel	2,320 psig (159.96 barg)
	F050P	Stainless steel	5,000 psig (344.74 barg)
HPC-Series	HPC010P ⁽³⁾	Nickel alloy C22 (N06022)	15,000 psig (1,034.21 barg)
	HPC015M	Stainless steel	6,991 psi (482.01 bar)
	HPC015N	Stainless steel	13,960 psi (962.51 bar)
	HPC015P	Stainless steel	15,374 psi (1,060.00 bar)
H-Series	All models	Stainless steel	1,450 psig (99.97 barg)
LF-Series	All models	Stainless steel	1,450 psig (99.97 barg)
LNG-Series	All models	Stainless steel	725.2 psig (50.001 barg)
R-Series	All models	Stainless steel	1,450 psig (99.97 barg)
T-Series	All models	Titanium	1,450 psig (99.97 barg)
TA-Series	TA010T	Tantalum	2,245 psig (154.79 barg)
	TA025T	Tantalum	1,142 psig (78.74 barg)
	TA050T	Tantalum	852 psig (58.74 barg)
	TA075T	Tantalum	1,432 psig (98.73 barg)
	TA100T	Tantalum	920 psig (63.43 barg)
	TA200T	Tantalum	687 psig (47.37 barg)
	TA300T	Tantalum	983 psig (68 barg)
CDM	CDM100M	Stainless steel	1,450 psig (99.97 barg)
	CDM100P	Nickel alloy C22 (N06022)	3,600 psig (248.21 barg)
GDM		Stainless steel	3,625 psig (249.93 barg)
FDM	Short stem	Stainless steel, nickel alloy C22 (N06022), titanium, zirconium	3,000 psig (206.84 barg)

Family	Model	Wetted material	Pressure
		Long stem	1,450 psig (99.97 barg)
FVM	Short stem	Stainless steel	3,000 psig (206.84 barg)
	Long stem	Stainless steel	1,450 psig (99.97 barg)
HFVM	Short stem	Stainless steel	3,000 psig (206.84 barg)
SGM		Ni-Span-C	145 psig (10.00 barg) ⁽⁴⁾

- (1) This range covers most of the pressure ratings for ELITE stainless steel meters. For a comprehensive list, see Micro Motion ELITE Coriolis Flow and Density Meters Product Data Sheet
- (2) Models CMF010P, CMFS010P, CMFS015P, and CMF400P have nickel alloy C22 (N06022) tubes and stainless steel fittings.
- (3) ETO H2 meter is 316L stainless steel material with standard helium leakage test procedure.
- (4) When the Sample Conditioning System is selected with a pressure regulator, the inlet pressure can be greater, up to 1,450 psig (99.97 barg) on some options.