

New!

Micro Motion CNG050 Compressed Natural Gas Mass Flowmeter with MVD™ Technology



MVD™ technology CE

Micro Motion

FISHER-ROSEMOUNT™

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Micro Motion CNG050 Flowmeters

The first full range CNG flowmeter designed specifically for compressed natural gas, resulting in better performance for the CNG industry

The CNG050 meter was specifically designed for the CNG industry to meet the challenges of measuring compressed natural gas. The meter's increased rangeability allows customers the flexibility to use the sensor for automobile or light and heavy duty vehicle dispenser designs.

Due to innovative design techniques and state-of-the-art manufacturing processes, Micro Motion's CNG050 model flowmeters are less expensive than typical Coriolis meters, which means you can choose this highly accurate and reliable technology for all CNG applications.

Micro Motion CNG050 meters feature integral transmitters, making them easy to install. Offered with Series 1000 and Series 2000 transmitters with MVD technology, customers can choose either single- or multivariable output configurations with milliamp, pulse, and digital outputs and an integral display.

Like all our flowmeters, Micro Motion CNG050 meters offer highly accurate direct mass and volume flow measurement.

Micro Motion CNG050 meters are designed to perform in even the most harsh operating environments, and carry hazardous area approvals for the U.S.A., Canada, and Europe.

Easy to use

No moving parts, no need for periodic recalibration, non-intrusive, no regular maintenance requirements

Wide Rangeability

Measures mass and volume of CNG for both car and bus dispensers.

Reduced fill times

Having a higher flow rate capacity now means that vehicles can get back on the road faster than ever.

Proven technology

Nothing to wear out or break down—more than 250,000 Micro Motion meters are installed in applications world-wide, including 10,000 in CNG applications.

Greater accuracy and reliability

CNG accuracy of 0.5% of delivered batch over a flow range of 6.5 to 170 lb/min (177 to 4627 kg/hr). This translates into reduced dispenser losses and is approvable by weights and measures agencies.

Weights and Measures

NTEP (National Type Evaluation Program) approved for use in trade in the U.S.A.

Easy to install

No special mounting, no straight run requirements, and no flow conditioning.

Micro Motion® Series 1000 and 2000 Transmitters with MVD™ Technology

The new approach to sensor electronics

Only Micro Motion® combines new MVD™ Technology with a modular architecture that redefines sensor electronics. That means multivariable digital processing that's scalable for any flow application. MVD Technology gets your most basic – or most complex – application up and running quicker, easier and more cost effectively than ever before.

MVD Technology

MVD Technology makes your Micro Motion flowmeter work smarter. Front-end digital processing dramatically reduces signal noise and gives you faster response time, compared to analog devices. Innovative MVD Technology also enables multiple variable measurement and diagnostics never before possible. And this is just the beginning.

Only MVD Technology allows you to:

- Measure multiple variables
- Choose integral or remote mounting with a standard, 4-wire signal cable
- Identify and resolve problems easily with built-in smart diagnostics
- Choose transmitter capabilities based on your application's needs
- Upgrade transmitter functionality as needed

What's the bottom line of MVD Technology?

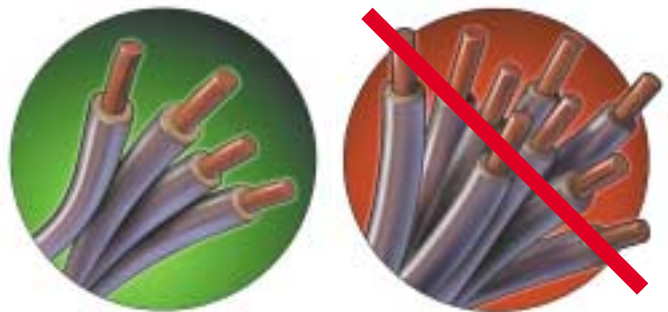
Reducing costs in your bottom line through improved process consistency and maximized uptime.

Scalable architecture

You asked for it and Micro Motion has delivered. Series 1000 and 2000 transmitters allow you to choose the functionality you want. Series 1000 transmitters are perfect for applications that require single variable measurement. For more demanding applications, Series 2000 transmitters measure multiple variables simultaneously, and have more output and digital communication options.

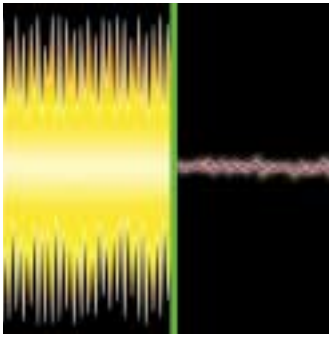
What happens when you put Micro Motion's MVD Technology together with the Series 1000 and 2000 transmitters?

Only four wires



Approved for hazardous areas





**Clean, noise-free,
digital signals
that improve
measurement
performance**

Delivering a suite of power-packed standard features

All Series 1000 and 2000 transmitters offer:

- Class I, Division 1 / Zone 1 local operator interface to:
 - View process variables
 - View meter status at a glance
 - Start, stop, and reset transmitter totalizers
 - Zero flowmeter
 - Perform output simulation tests
 - Scale outputs
 - Set password security
- Compact, integral mounting to sensor with 360 degrees of rotation
- Cost-effective, hassle-free, 4-wire remote mounting to sensor
- Simple start-up with virtually no special programming requirements
- Digital communications
- Easy to access diagnostics: meter status, process issues, and more

Series 1000 single-variable transmitter

For applications requiring only a single flow variable

Series 1000 transmitters are ideal for flow applications where only a single variable is needed at any given time. Series 1000 transmitters feature a milliamp and a frequency/pulse output, and HART® and Modbus® digital communications.

Series 1000 transmitters can output any *one* of the following variables:

- **Flow rate**
- **Total flow**
- **Density**
- **Temperature**

Series 2000 Multivariable Transmitter

For applications requiring simultaneous monitoring of multiple flow variables

Series 2000 transmitters are designed specifically for applications where multiple variables are needed simultaneously. Series 2000 transmitters feature a milliamp and a frequency/pulse output, plus HART and Modbus digital communications.

Series 2000 transmitters can *simultaneously* output:

- **Flow rate**
- **Total flow**
- **Density**
- **Temperature**

Performance specifications

Flow Specifications		Mass		Standard Volume ¹
Nominal flow range		<i>lb/min</i> 2.5 to 85	<i>kg/h</i> 68 to 2313	<i>SCFM</i> 50 to 1700
Maximum flow rate ²		<i>lb/min</i> 170	<i>kg/h</i> 4627	<i>SCFM</i> 3400
Accuracy ³	±1.5%	<i>lb/min</i> 2.5 to 6.5	<i>kg/h</i> 68 to 177	not applicable
	±0.5%	<i>lb/min</i> 6.5 to 170	<i>kg/h</i> 177 to 4627	not applicable
Repeatability ³	±0.3%	<i>lb/min</i> 2.5 to 170	<i>kg/h</i> 68 to 4627	not applicable
Minimum Measured Quantity		<i>lb</i> 2.5	<i>kg</i> 1.1	

¹ CNG with SG = 0.66 at 60°F (17°C) and 14.73 psia.

² The pressure drop on CNG at the maximum flow rate is approximately 300 psid.

³ Accuracy and repeatability are in terms of percent of total batch delivered on CNG.

Pressure Specifications

Flow tube rating ¹	5000 psi	345 bar
Process connection rating ²	5000 psi	345 bar
Union to NPT adaptor piece rating ³	4600 psi	317 bar
Housing rating	<i>Housing is not rated for pressure containment</i>	

¹ Pressure rating at 77°F (20°C), according to ASME B31.3. Above 200°F (93°C), and up to the maximum operating temperature of 257°F (125°C), the maximum operating pressure is 4712 psi (325 bar).

² All fittings are rated to 5000 psi; the Union SWG type fitting according to ASME B31.3. and the SAE fitting according to SAE J1453.

³ Pressure rating of the additional adaptor piece (#12 O-ring face seal to female NPT) that is provided with process connection option 239.

Functional specifications

Environmental limits

Process fluid	-40 to 257°F (-40 to 125°C)	
Ambient temperature limits	Storage	-40 to 158°F (-40 to 70°C)
	Operating ¹	-40 to 140°F (-40 to 60°C)
Humidity limits	5 to 95% relative humidity, non-condensing at 140°F (60°C).	
Vibration limits	Meets IEC 68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0g.	

Environmental effects

EMI effects	Series 1000 and 2000 transmitters conform to NAMUR NE21 (June 1997). Series 1000 and 2000 transmitters meet EMC directive 89/336/EEC per EN 50081-2 (August 1993) and EN50082-2 (March 1995), and EN 61326 Industrial.
Ambient temperature effect	On analog outputs $\pm 0.005\%$ of span per °C.

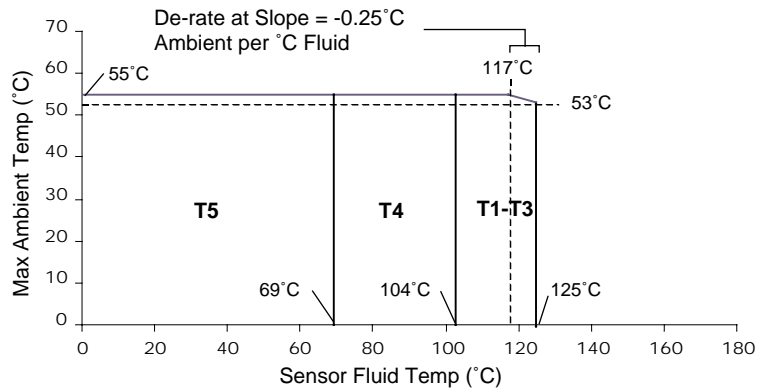
Hazardous area classifications, CNG050 sensor with local core processor

UL is a U.S.A. approvals agency, CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. (C-US) and in Canada. CENELEC is a European standards organization.

UL and CSA²	Class I, Div. 1, Groups C and D Class I, Div. 2, Groups A, B, C, and D Class II, Div. 1, Groups E, F, and G
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CENELEC	EEx ib IIC T1...T5 ¹
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CENELEC Allowable CNG050 Sensor Temperature Rating with Integrally Mounted Core Processor, Based on Ambient/Fluid Temperature



¹ The CENELEC "T" rating is defined as the maximum surface temperature of the flowmeter. The "T" rating of the hazardous area, and ambient temperatures above 53°C, restrict the allowable temperature of the process fluid, as shown in the graph above. Ambient temperature limits for CENELEC-compliant flowmeters are -40°C to 55°C.

² At time of printing, UL approval for Micro Motion CNG050 flowmeters is pending. CSA C-US approval is available for use in the United States.

Functional specifications *continued*

Hazardous area classification, Series 1000 and Series 2000 transmitters

UL and CSA

Transmitter

Class I, Div. 1, Groups C and D, Class II, Div. 1, Groups E, F, and G explosion proof (when installed with approved conduit seals). Otherwise, Class I, Div. 2, Groups A, B, C, and D.

Outputs

Provides nonincendive sensor outputs for use in Class I, Div. 2, Groups A, B, C, and D; or intrinsically safe sensor outputs for use in Class I, Div. 1, Groups C and D or Class II, Div. 1, Groups E, F, and G.

CENELEC

Flameproof when installed with approved cable glands:

with display EEx d [ib] IIB+H2 T6
without display EEx d [ib] IIC T6

Increased safety when installed with approved cable glands:

with display EEx de [ib] IIB+H2 T6
without display EEx de [ib] IIC T6

Software functionality

The CNG050 sensor can be used with any available software version of the Micro Motion Series 1000 or 2000 transmitter with MVD technology. The standard software option of the Series 1000 or 2000 is most common.

Weights and measures configuration lockout

For applications that require weights and measures approval for legal trade, the weights and measures configuration lockout software option of the Series 2000 transmitter should be ordered with the CNG050 sensor. With this option, the transmitter can be changed from operating (secure) mode to configuration mode, and back again by use of a physical switch located inside the transmitter. The transmitter will only register flow when in the operating (secure) mode. The transmitter will only allow configuration changes and zeroing of the meter when in the configuration mode.

The transmitter housing is provided with the means for physical sealing with this option.

The weights and measures configuration lockout is not available with remotely mounted transmitters.

Electrical connections

Input and output connections

Three pairs of wiring terminals for transmitter outputs.

Screw terminals accept one or two solid conductors, 14 to 12 AWG (2.5 to 4mm²); or one or two stranded conductors, 22 to AWG (0.34 to 2.5 mm²).

Power connection

One pair of wiring terminals accepts either AC or DC power.

One internal ground lug for power-supply ground wiring.

Screw terminals accept one or two solid conductors, 14 to 12 AWG (2.5 to 4mm²); or one or two stranded conductors, 22 to AWG (0.34 to 2.5 mm²).

Service port connection

Two clips for temporary connection to the service port.

Functional specifications *continued*

Input/output signals

- One 4-wire sensor signal input connection with ground, intrinsically safe.
- One 4-20 mA output
 - Not intrinsically safe
 - Isolated to ± 50 VDC from all other outputs and earth ground
 - Maximum load limit, 600 ohms
 - Can report mass flow, volume flow, density, or temperature
 - Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)
- One active frequency/pulse output
 - Not intrinsically safe
 - Can report mass flow or volume flow, which can be used to indicate flow rate or total
 - For Series 1000, output is dependent on mA output; for Series 2000, output is independent
 - Scalable to 10,000 Hz
 - Maximum output of 30 VDC max., 24 VDC typical
 - Internal 2.2 kohm pull-up
 - Output is linear with flow rate to 12,500 Hz

Digital communications

- One service port can be used for temporary connection only.
 - Uses RS-485 Modbus signal, baud rate of 38.4 kilobaud, one stop bit, no parity
- HART Bell 202 signal is superimposed on the primary milliamp output, and is available for host system interface.
 - Frequency 1.2 and 2.2 kHz
 - Amplitude 0.8 V peak-to-peak
 - 1200 baud
 - Requires 250 to 600 ohms load resistance
- One RS-485 output can be used for direct connection to a HART or Modbus host system.
 - Accepts baud rates between 1200 baud and 38.4 kilobaud.

Power supply

- Self-switching AC/DC input, automatically recognizes supply voltage.
- Complies with low voltage directive 73/23/EEC per IEC 1010-1 with amendment 2.
- Installation (Overvoltage) Category II, Pollution Degree 2.
- AC power** 85 to 265 VAC, 50/60 Hz, 5 watts typical, 8 watts maximum
- DC power** 18 to 100 VDC, 5 watts typical, 8 watts maximum
 - Minimum 22 VDC with 1000 feet of 18 AWG (300 meters of 0.8mm²) power-supply cable
- Fuse** IEC 127-1.25 fuse, slowblow

Physical specifications

Materials of construction

Wetted parts¹	316L stainless steel
Sensor housing	304L stainless steel
Core processor housing	CF3M stainless steel
Transmitter housing	NEMA 4X (IP67) epoxy painted cast aluminum

Model 1700 and 2700 housing

Terminal compartment contains output terminals, power terminals and service-port terminals. The output terminals are physically separated from the power- and service-port terminals.

The electronics compartment contains all electronics and standard display.

The sensor compartment contains the wiring terminals for connection to the core processor on the sensor.

Screw-terminal for chassis ground.

Cable gland entrances are either 1/2"-14 NPT or M20 x 1.5 female conduit ports.

Mounting

Model 1700 and 2700 field-mount transmitters are available integrally mounted to Micro Motion CNG050 sensors, or in a remote-mount configuration.

Remote-mount transmitters include a mounting bracket, and require a shielded 4-wire signal cable, up to 1000 feet (300 meters) in length, between the sensor and the transmitter. Hardware for installing the transmitter on the mounting bracket is included.

The integrally mounted transmitter can be rotated 360 degrees, in 90-degree increments. The remotely mounted transmitter can be rotated 360 degrees on the mounting bracket.

Interface/display

Segmented 2-line display with LCD screen with optical controls and flowmeter-status LED is standard. Suitable for hazardous area installation.

To facilitate various mounting orientations, the display can rotate on the transmitter, 360 degrees, in 90-degree increments.

LCD line 1 lists the process variable, line 2 lists the engineering unit of measure. Non-glare tempered glass lens.

Display controls feature optical switches that are operated through the glass, with a red LED visual-feedback to confirm when a "button" is pressed.

Display functions

Operational: View process variables; start, stop, and reset totalizers.

Offline: View diagnostic messages, zero flowmeter, initiate output simulation, and diagnostic self-check.

Status light

Three-color LED status light on display panel indicates flowmeter condition at a glance. Green, yellow, or red, either continuously on or blinking status light immediately indicates flowmeter status.

¹ General corrosion guides do not account for cyclical stress, and therefore should not be relied upon when choosing a wetted material for your Micro Motion flowmeter. Please refer to Micro Motion's corrosion guide for material compatibility information.

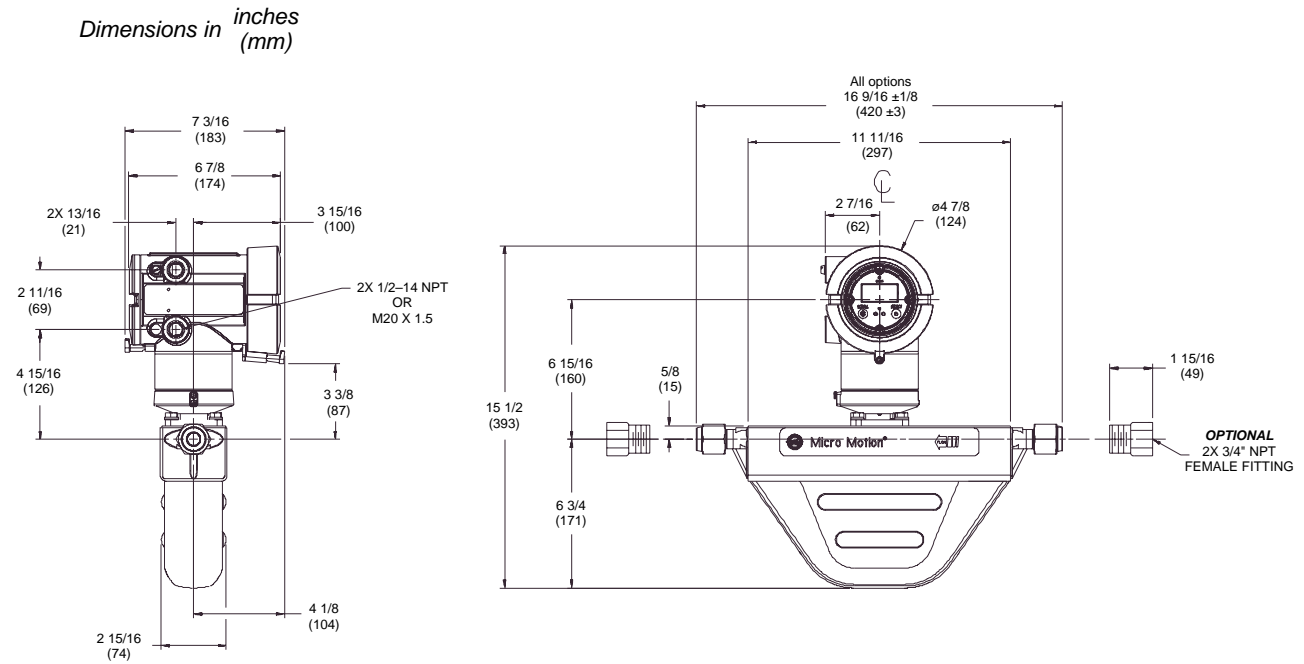
Physical specifications *continued*

Weight

Sensor with local core processor	13 lb	5.9 kg
Sensor with integrally mounted transmitter	17 lb	7.7 kg
Remotely mounted Model 1700 or 2700 transmitter	8 lb	3.6 kg

Dimensions

CNG050 with Integrally Mounted Model 1700 or 2700 Transmitter¹

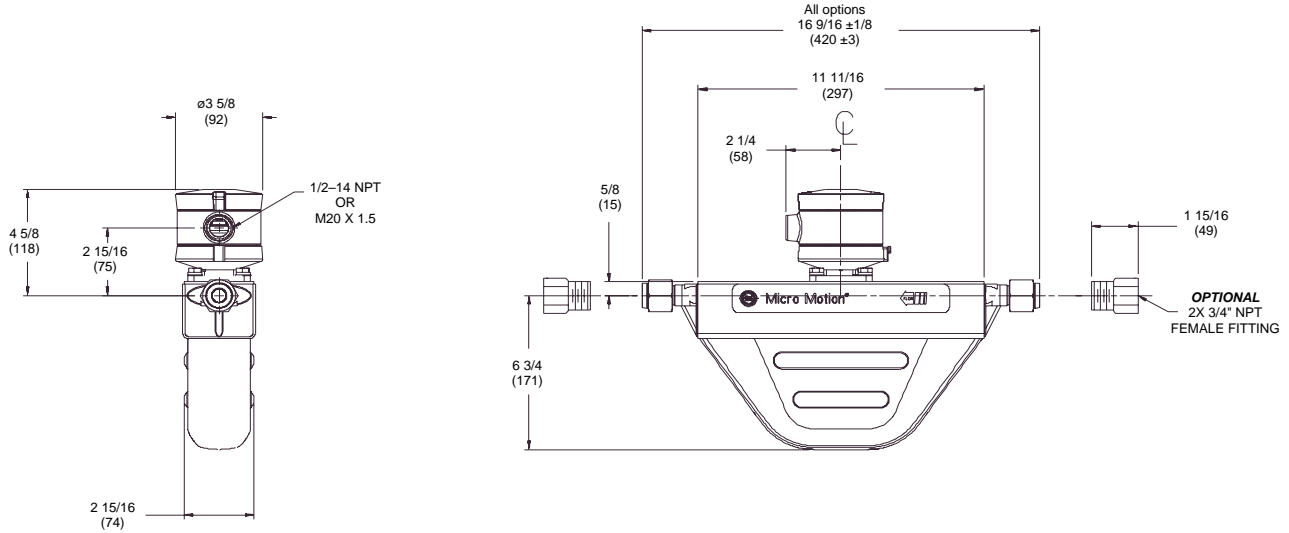


¹ The integrally mounted transmitter and display can be independently rotated for easier access or greater visibility.

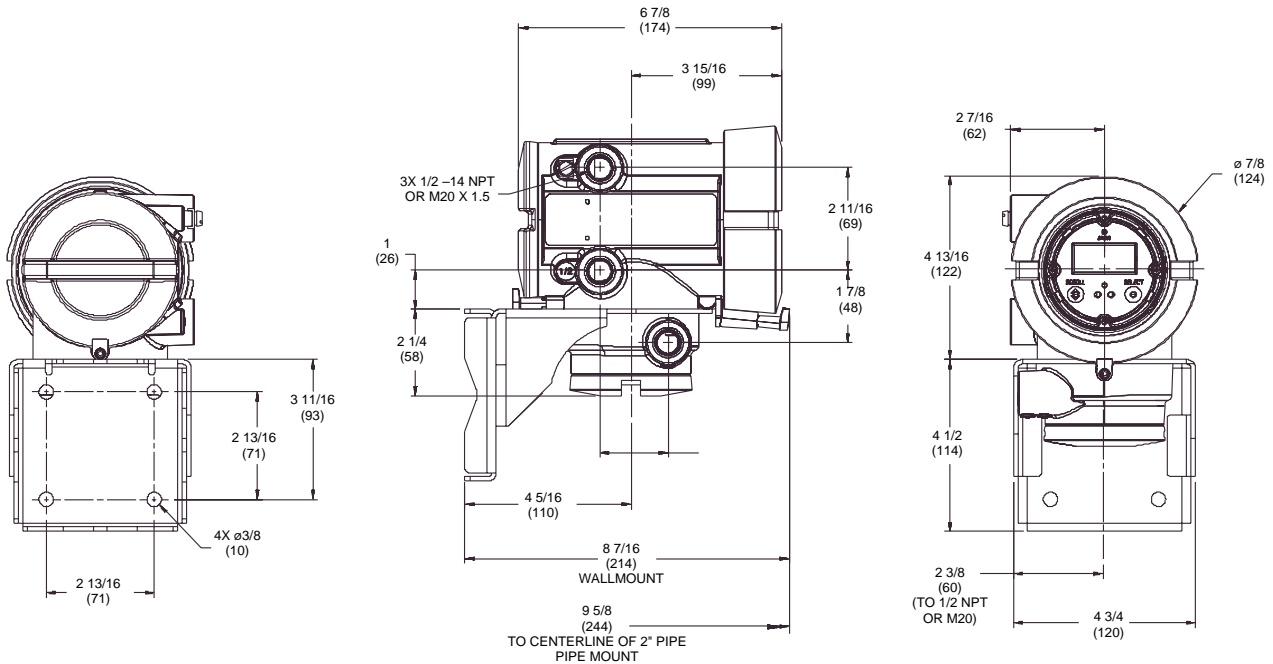
Physical specifications *continued*

Dimensions in *inches*
(*mm*)

CNG050 with Local Core Processor for Remotely Mounted Series 1000 or Series 2000 Transmitter



Model 1700 or 2700 Remote-mount Transmitter (with mounting bracket)



Ordering information—CNG050 Sensor

Two model number codes are required for purchasing a Micro Motion CNG050 flowmeter:

- For the sensor code, see this page.
- For the transmitter codes, see pages 14 (Series 1000) and 15 (Series 2000).

Model	Product Description
CNG050S	Micro Motion Coriolis CNG050S sensor; 1/2 inch; 316L stainless steel
Code	Process Connections
239 ¹	3/4- inch NPT–female adapter; CAJON compatible size 12 VCO union fitting
290 ²	CAJON compatible size 12 VCO union fitting
291 ²	Union size 12 SAE fitting (Universal thread)
999	CEQ process connection
Code	Case Options
N	Standard
X	CEQ case option
Code	Electronics Interface
A ³	Local core processor with remote mount Series 1000/2000
C ³	For integrally mounted 1700 or 2700 transmitter (at time of purchase)
Code	Conduit Connections
	Electronics interface Code 'A': (local core processor)
B	1/2-inch NPT — no gland
C	1/2-inch NPT with brass-nickel cable (cable dia. 0.335 in. to 0.394 in.)
D	1/2-inch NPT with stainless steel cable gland (cable dia. 0.335 in. to 0.394 in.)
E	M20 — no gland
F	M20 brass-nickel cable gland (cable dia. 8.5 to 10.0 mm)
G	M20 stainless steel cable gland (cable dia. 8.5 to 10.0 mm)
	Electronics interface Code 'C': (integral mount 1700/2700 — no conduit connections)
A	No gland
Code	Approvals
M	Micro Motion standard (no approval)
U	UL
C	CSA (Canada only)
A	CSA (USA and Canada)
Z	CENELEC
Code	Language
A	Danish Danish Quick Reference Guide and English Manual
C	Icelandic Icelandic Quick Reference Guide and English Manual
D	Dutch Dutch Quick Reference Guide and English Manual
E	English English Quick Reference Guide and English Manual
F	French French Quick Reference Guide and English Manual
G	German German Quick Reference Guide and English Manual
H	Finnish Finnish Quick Reference Guide and English Manual
I	Italian Italian Quick Reference Guide and English Manual
J	Japanese Japanese Quick Reference Guide and English Manual
K	Greek Greek Quick Reference Guide and English Manual
M	Chinese Chinese Quick Reference Guide and English Manual
N	Norwegian Norwegian Quick Reference Guide and English Manual
O	Polish Polish Quick Reference Guide and English Manual
P	Portuguese Portuguese Quick Reference Guide and English Manual
R	Russian Russian Quick Reference Guide and English Manual
S	Spanish Spanish Quick Reference Guide and English Manual
W	Swedish Swedish Quick Reference Guide and English Manual
Code	Future Options
ZZ	Reserved for future option
Code	Factory Options
Z	Standard product
X	CEQ product
Typical Model Number: CNG050S 290 N C A M E Z Z Z	

¹ 3/4-inch female NPT to O-ring face seal adapter rated to 4600 psi/317 bar.

² Ready for face seal. O-ring not included.

³ Class I, Div. 1 available only when connected to a Micro Motion transmitter.

Ordering information—Series 1000 with MVD™ Technology

Model	Product Description	
1700	Micro Motion one-variable-at-a-time flow or density transmitter	
Code	Mounting	
R	Remote mount transmitter	
I	Integral mount transmitter	
Code	Power	
1	18 to 30 VDC and 85 to 265 VAC; self switching	
Code	Display	
1	Dual line display for process variables and totalizer reset (standard)	
3	No display	
Code	Output	
A	One mA; one frequency; RS-485	
Code	Conduit Connections	
B	1/2-inch NPT — no gland	
C	1/2-inch NPT with brass-nickel cable gland	
D	1/2-inch NPT with stainless steel cable gland	
E	M20 — no gland	
F	M20 with brass-nickel cable gland	
G	M20 with stainless steel cable gland	
Code	Approvals	
M	Micro Motion standard (no approval)	
U	UL	
C	CSA (Canada only)	
A	CSA (USA and Canada)	
Z	CENELEC — increased safety	
F	CENELEC — flameproof	
Code	Language	
A	Danish	Danish Quick Reference Guide only
C	Icelandic	Icelandic Quick Reference Guide only
D	Dutch	Dutch Quick Reference Guide only
E	English	English Quick Reference Guide and Manual
F	French	French Quick Reference Guide and Manual
G	German	German Quick Reference Guide and Manual
H	Finnish	Finnish Quick Reference Guide only
I	Italian	Italian Quick Reference Guide only
J	Japanese	Japanese Quick Reference Guide only
K	Greek	Greek Quick Reference Guide only
M	Chinese	Chinese Quick Reference Guide only
N	Norwegian	Norwegian Quick Reference Guide only
O	Polish	Polish Quick Reference Guide only
P	Portuguese	Portuguese Quick Reference Guide only
R	Russian	Russian Quick Reference Guide only
S	Spanish	Spanish Quick Reference Guide only
W	Swedish	Swedish Quick Reference Guide only
Code	Future Options	
ZZ	Reserved for future use	
Code	Factory Options	
Z	Standard product	
Typical Model Number: 1700 I 1 1 A B M E Z Z Z		

Ordering information—Series 2000 with MVD™ Technology

Model	Product Description	
2700	Micro Motion multivariable flow and density transmitter	
Code	Mounting	
R	Remote mount transmitter	
I	Integral mount transmitter	
Code	Power	
1	18 to 30 VDC and 85 to 265 VAC; self switching	
Code	Display	
1	Dual line display for process variables and totalizer reset (standard)	
3	No display	
Code	Output	
A	One mA; one frequency; RS-485	
E	FOUNDATION fieldbus	
G	PROFIBUS PA	
Code	Conduit Connections	
B	1/2-inch NPT — no gland	
C	1/2-inch NPT with brass-nickel cable gland	
D	1/2-inch NPT with stainless steel cable gland	
E	M20 — no gland	
F	M20 with brass-nickel cable gland	
G	M20 with stainless steel cable gland	
Code	Approvals	
M	Micro Motion standard (no approval)	
U	UL	
C	CSA (Canada only)	
A	CSA (USA and Canada)	
Z	CENELEC — increased safety	
F	CENELEC — flameproof	
Code	Language	
A	Danish	Danish Quick Reference Guide only
C	Icelandic	Icelandic Quick Reference Guide only
D	Dutch	Dutch Quick Reference Guide only
E	English	English Quick Reference Guide and Manual
F	French	French Quick Reference Guide and Manual
G	German	German Quick Reference Guide and Manual
H	Finnish	Finnish Quick Reference Guide only
I	Italian	Italian Quick Reference Guide only
J	Japanese	Japanese Quick Reference Guide only
K	Greek	Greek Quick Reference Guide only
M	Chinese	Chinese Quick Reference Guide only
N	Norwegian	Norwegian Quick Reference Guide only
O	Polish	Polish Quick Reference Guide only
P	Portuguese	Portuguese Quick Reference Guide only
R	Russian	Russian Quick Reference Guide only
S	Spanish	Spanish Quick Reference Guide only
W	Swedish	Swedish Quick Reference Guide only
Code	Software Options 1	
Z	Flow and density variables (standard)	
Code	Software Options 2	
Z	No software options 2	
A	Standard fieldbus function blocks	
X	CEQ software	
Code	Factory Options	
Z	Standard product	
X	CEQ product	
Typical Model Number: 2700 I 1 1 A B M E Z Z Z		

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