Product Data Sheet
PS-001885, Rev. B
September 2015

Micro Motion® Model 5700 Transmitters with MVD™ Technology

Micro Motion® Model 5700 transmitters with MVD™ technology deliver powerful features that make managing your process easier.

Repeatable, reliable, accurate measurements

- Faster processing speed delivers the best response even in the most challenging applications such as meter proving, filling & dosing and batching
- Smart Meter Verification provides you with the confidence you need in your meter performance
- Zero verification confirms the calibration and indicates when it's time to re-zero the meter

A window into your process

- Easy access to detailed measurement history gives you valuable insight into your process for better troubleshooting and optimization
- Real-time indication of multi-phase flow events allow for greater process control
- High-accuracy density measurement reduces or eliminates waste in your process. While the embedded historian records upsets and process deviations.

Productivity through simplified solutions

- Designed to minimize the time and expertise needed to install and operate the flowmeter
- Up to five fully configurable I/O channels that can be easily upgraded with changing needs
- Offline configuration and auditing through new file shuttling capability

2200S	2400S	1700 2700	1500 2500	3300 3350	3500 3700	5700
Compact integral 2-wire transmitter	Compact integral transmitter	Versatile field-mount transmitter	Compact control-room transmitter	Frequency-input discrete controller	Integrated control and measurement platform	Advanced field - mount transmitter

Micro Motion®

EMERSON™
Process Management

Micro Motion Model 5700 transmitters

Model 5700 transmitters deliver the best measurement technology and offer unparalleled support — ensuring total measurement confidence, valuable process insight and greater operational efficiency. These transmitters provide the scalability, compatibility and performance that your application demands.

Simplified installation and commissioning

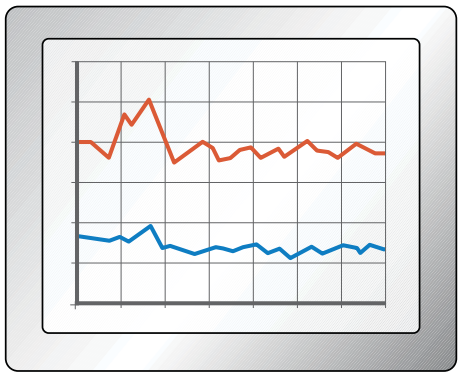
An intuitive interface, spacious side-access wiring compartment and convenient mounting brackets

Smart Meter Verification: advanced diagnostics for your entire system

Our online tool verifies your meter performs as well as the day it was installed, giving you assurance in less than 90 seconds

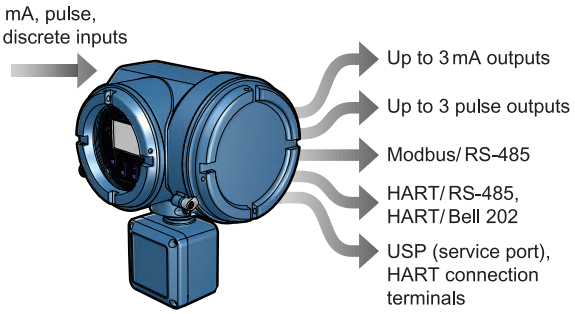
Measurement history for easier troubleshooting and optimization

Detailed history files deliver key time-stamped information about your process from configuration changes and alerts to process events and statistics.



Unmatched system connectivity and services interfaces

Up to five fully configurable I/O channels with multiple mA, discrete and pulse outputs, and several powerful service interfaces



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Model 5700 enhancements

Internal memory

The Model 5700 transmitter provides a backup of:

- Transmitter configurations
- Meter verification baseline and history
- Data log
- Licensing key

If you need to replace your transmitter, move your old memory to the new transmitter without losing any data or licensing information.

Software licensing

Software licensing makes it possible to:

- Purchase permanent features and add them later
- Trial features, such as two-phase flow detection, for 60 days before buying
- Order up to 5 input/output channels through the license

Large graphical display

- Supports multiple languages
- Supports full configuration capabilities directly from the display
- Provides understandable alert codes

Two-phase flow detection

Two-phase flow detection provides clear, concise information about fluid conditions, including notification about the following three fluid regimes:

- Single phase
- Moderate two-phase flow
- Severe two-phase flow

Physical design

- Conduit and terminal compartments are accessible from the sides
- Modular board stack design
- Spacious wiring compartments
- No need for a service tool when breaking the seal for proving
- Remote mounting bracket
- Clip terminals for a HART-based handheld communicator
- A Universal Service Port (USP) connects and transfers data using standard, easily available equipment

External inputs

Links, stores, and diagnoses data from:

- mA, discrete, and frequency inputs
- Wired HART
- Smart WirelessHART

Troubleshooting tools

The Model 5700 transmitter stores data in non volatile memory with Real Time Clock, including:

- Meter fingerprint
- Audit trail
- Alert log
- Long term data historian: 5-minute Min, Max, Avg, Std Dev (10 years)
- Short term data historian: 1-second data (30 days)

Applications

Applications are custom designed programs and software that offer additional functionality and performance to transmitters. These applications are available through options in the transmitter model code, see the ordering information section for details.

Smart Meter Verification

Provides a quick, complete assessment of a Micro Motion Coriolis meter, determining whether the meter has been affected by erosion, corrosion, or other influences affecting meter calibration. No secondary references are required to perform this operation, and the meter can continue normal process measurement while the test is in progress.

Discrete batch control

- Simple batch control based on totalizer values
- For transmitters with analog or intrinsically safe outputs, the frequency output can be configured as a discrete output

Petroleum measurement and API correction option

Adds the following features:

- Accepts inputs from temperature and pressure devices
- Calculates values as per May, 2004 API Chapter 11.1 and 11.2.4 (including Sept. 2007 addendum)
  - Relative density (specific gravity and API gravity) at reference temperature from observed density and temperature
  - Volume corrected to reference temperature and pressure
- Calculates flow-weighted average temperature and flow-weighted average observed density (specific gravity and API gravity)

Concentration measurement

Provides concentration measurement based on either industry-specific or liquid-specific units and relationships. Standard measurement options include:

- Industry-specific:
  - °Brix
  - °Plato
  - °Balling
  - °Baumé at SG60/60
  - Specific gravity
- Liquid-specific:
  - %HFCS
  - Concentration derived from reference density
  - Concentration derived from specific gravity

Additionally, the application can be customized for site-specific concentration measurement (such as $\%HNO_3$, %NaOH).

Advanced Phase Measurement

- Accurately measures liquid or gas flow in multiple-phase conditions
  - Maximizes production with real-time insight into wells with low to no gas void fraction
  - Monitors the whole process (Net Oil totals, gas void fraction (GVF), and water cut) with one device
- Facilitates reliable measurement
  - Historian automatically captures all production data
  - Easy setup and integration into SCADA/control system
- Provides single well Net Oil Computer calculations
  - Offers real-time Net Oil and Net Water measurements

Electrical connections

Connection	Description
Input/Output	Up to 5 pairs of wiring terminals for transmitter I/O and communications
Power	■ One pair of wiring terminals accepts AC or DC power ■ One internal ground lug for power-supply ground wiring
Sensor	■ 4-wire remote mount – 4 terminals for connection to 4-wire sensor ■ 9-wire remote mount – 9 terminals for connection to 9-wire sensor
Service port (HART)	Two clips for temporary connection to the service port
Universal Service Port	A USP (Universal Service Port) connected to commercially-available USB equipment and cables

Notes:

■Each screw terminal connection accepts one or two solid conductors, 14 to 12 AWG (2.5 to 4.0 mm^2) or one or two stranded conductors, 22 to 14 AWG (0.34 to 2.5 mm^2). Each plug type connector accepts one stranded or solid conductor, 24 to 12 AWG (0.20 to 2.5 mm^2).

■ For integral mount transmitters (mounting code I), the connection between the transmitter and the sensor is not normally accessed.

Input/output signal detail

Available channels

Channels	A		B		C		D		E	
Wiring terminals	1	2	3	4	5	6	7	8	9	10
Channel options	mA output (1) (HART)		mA output (2)		mA output (3)		mA input		RS-485	
			Frequency (2)(1)		Frequency (1)		Frequency (2)(1)			
			Discrete output (1)		Discrete output (2)		Discrete output (3)			
					Discrete input (1)		Discrete input (2)			
							Frequency input			

(1) The frequency output (2) can be mapped to channel B or D. For multiple frequency outputs, use Frequency (1) on channel C and Frequency (2) on either channel B or D.

Channel A specifications

Specification	mA output	mA output max loop resistance
Internal voltage	24VDC (nom)	820 ohm
External voltage	30VDC (max)	1080 ohm @ 30VDC
Scalable range	4-20mA	
Downscale fault	Configurable from 1.0 – 3.6 mA, default value = 2.0 mA	
Upscale fault	Configurable from 21.0 – 23.0 mA, default value = 22.0 mA	
Linearity	0.015 %Span Span = 16mA	

Note:
mA output is linear with process from 3.8 to 20.5 mA, per NAMUR NE-43 (February 2003).

Channel B specifications

Specification	mA output	mA output max loop resistance	Frequency output (2)	Digital output (1)
Internal voltage	24VDC (nom)	820 ohm	24VDC (nom) 22mA sourcing	24VDC (nom) 7mA sourcing
External voltage	30VDC (max)	1080 ohm @ 30VDC	30VDC (max) 500mA (max) sinking	30VDC (max) 500mA (max) sinking
Scalable range	4-20mA		0.01 Hz – 10 kHz	
Downscale fault	Configurable from 1.0 – 3.6 mA, default value = 2.0 mA		0Hz	
Upscale fault	Configurable from 21.0 – 23.0 mA, default value = 22.0 mA		Configurable from 10 Hz to 14.5 kHz, default value = 14.5 kHz	
Linearity	0.015 %Span Span = 16mA			
Resolution	.4 uA		+/- 1 pulse	

Note:
mA output is linear with process from 3.8 to 20.5 mA, per NAMUR NE-43 (February 2003).

Channel C specifications

Specification	mA output	mA output max loop resistance	Frequency output (1)	Digital output (2)	Digital input (1)
Internal voltage	24VDC (nom)	820 ohm	24VDC (nom) 22mA sourcing	24VDC (nom) 7mA sourcing	24VDC (nom) 7mA sourcing
External voltage	30VDC (max)	1080 ohm @ 30VDC	30VDC (max) 500mA (max) sinking	30VDC (max) 500mA (max) sinking	30VDC (max)
Scalable range	4-20 mA		0.01 Hz – 10 kHz		
Downscale fault	Configurable from 1.0 – 3.6 mA, default value = 2.0 mA		0Hz		
Upscale fault	Configurable from 21.0 – 23.0 mA, default value = 22.0 mA		Configurable from 10 Hz to 14.5 kHz, default value = 14.5 kHz		
Accuracy			+/- 1 pulse		
Linearity	0.015 %Span Span = 16mA				
Maximum positive threshold					3VDC
Minimum negative threshold					0.6VDC

Note:
mA output is linear with process from 3.8 to 20.5 mA, per NAMUR NE-43 (February 2003).

Channel D specifications

Specification	Frequency output (2)	mA input	Digital output (3)	Digital input (2)	Frequency input
Internal voltage	24VDC (nom) 2.21 kilo ohm pull-up resistor	24VDC (nom)	24VDC (nom) 2.21kilo ohm pull-up resistor	24VDC (nom) 2.21 kilo ohm pull-up resistor	24VDC (nom) 2.21 kilo ohm pull-up resistor
External voltage	30VDC (max) 500mA (max) sinking	30VDC (max)	30VDC (max) 500mA (max) sinking	30VDC (max)	30VDC (max)
Scalable range	0.01 Hz – 10 kHz	4 - 20 mA Fault indication if mA input drops below 3.8 mA or goes above 20.5 mA			
Downscale fault	0Hz				
Upscale fault	Configurable from 10 Hz to 14.5 kHz, default value = 14.5 kHz				
Accuracy	+/- 1 pulse				
Input resistance		100 ohm			
Max frequency				100 Hz	3500 Hz
Maximum positive threshold				3VDC	3VDC
Minimum negative threshold				0.6VDC	0.6VDC

Sensor input mounting codes

Mounting codes	Description
I (integral mount)	Integrally mounted to sensor, no external input connection
C (9-wire remote mount)	One 9-wire sensor signal input connection, intrinsically safe
R (4-wire remote mount)	One 4-wire sensor signal input connection, intrinsically safe

Digital communications

Protocols	Outputs and descriptions
Modbus/USB	■ One service port that can be used for a temporary connection only. ■ Connects to a PC via USB as if the transmitter had a built-in USB/RS-485 converter. ■ Supports all Modbus data rates. ■ Requires a USB A/male-to-A/male cable.
Modbus/RS-485, HART/RS-485	■ Available on channel E, if purchased. ■ One RS-485 output can be used for direct connection to HART or Modbus host systems. ■ Accepts data rates between 1200 baud and 38.4 kilobaud. ■ 115.2 kilobaud is also available as a special order item. ■ Uses the latest HART 7 standard.
HART/Bell 202	■ Available on Channel A, if purchased. ■ HART Bell 202 signal is superimposed on the primary milliamp output, and is available for host system interface. ■ Requires 250 to 600 ohms load resistance. ■ Uses the latest HART 7 standard.

Power supply

- Self switching AC/DC input, automatically recognizes supply voltage
- Complies with Low Voltage Directive 2006/95/EC per IEC 61010-1 Ed. 3.0 2010-06; Overvoltage Category II, Pollution Degree 2
- For European installations, install a switch or circuit breaker that is suitably located and easily reached. Mark the switch or circuit breaker as the disconnecting device for the transmitter, in compliance with the Low Voltage Directive 2006/95/EC.

Type	Value
AC power	■ 85 to 265 VAC, 50/60 Hz ■ 6 watts typical, 11 watts maximum
DC power	■ 18 to 100 VDC ■ 6 watts typical, 11 watts maximum ■ Size the length and diameter of power conductors to provide 18VDC minimum at the power terminals at a load current of 0.7A
Fuse	1.5A Slow Blow (UL 248-14)

Environmental limits

Ambient temperature limits

Type	Fahrenheit	Celsius
Operating	–40 to +149 °F	–40 to +65 °C
	Note: The display can lose visibility below –22 °F (–30 ° C).	
Storage	–40 to +185 °F	–40 to +85 °C

Vibration limits

Mount type	Value
Non truck mount	Meets IEC 68-2-6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g
Truck mount	Meets IEC 68-2-6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g (remote mount)

Humidity limits

The humidity limits are 5 to 95% relative humidity, non-condensing at 140 °F (60 °C).

Environmental effects

EMI effects

Complies with:

- EMC directive 2004/108/EC per EN 61326 Industrial; check availability for your country
- NAMUR NE-21 (09.05.2012)

Ambient temperature effect

Ambient temperature effect on mA outputs shall not exceed +/-0.005% of span per degree C.

Hazardous area classifications

CSA, and CSA-US

- Ambient temperature is limited to -40°F (-40°C) to 149 °F (65 °C) for CSA compliance.
- 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.
- 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.

IECEx

Ambient temperature range is -40°F (-40°C) to 149 °F (65 °C) for IECEx compliance.

Output option	Code	Approval (See IECEx approval codes)			
Configurable I/O	A	IA	Flameproof	Ex db [ib] IIB+H_2 T6 Gb	Standard display
				Ex db [ib] IIC T6 Gb	No display or IIC display
				Ex tb [ib] IIIC T75°C Db IP66/IP67	
		3A (When integrally mounted on the sensor)	Non sparking	Ex nA nC IIB+H_2 T5 Gc	Standard display
				Ex nA nC IIC T5 Gc	No display or IIC display

IECEx approval codes

Code	Description
IA	Used in IECEx EPL Gb/Db Zone 1/21 with flameproof (Ex db) terminal compartment
3A	Used in IECEx EPL Gc Zone 2 non sparking

ATEX

Ambient temperature range is -40°F (-40°C) to 149 °F (65 °C) for ATEX compliance.

Output option	Code	Approval (See ATEX approval codes)			
Configurable I/O	A	CE 0575 Ⓔx II 2 G			II 2 D Ex tb [ib] IIIC T 75 °C Db IP66/IP67
		FA	Flameproof	Ex db [ib] IIB+H_2 T6 Gb	Standard display
				Ex db [ib] IIC T6 Gb	No display or IIC display
		CE Ⓔx II 3 G			II 3 D Ex tc IIIC T 75°C Dc IP66/IP67
		VA (integral only)	Non sparking	Ex nA nC IIB+H_2 T5 Gc	Standard display
				Ex nA nC IIC T5 Gc	No display or IIC display

ATEX approval codes

Code	Description
FA	Used in ATEX II 2 G/D Zone 1/21 with flameproof (Ex db) terminal compartment.
VA	Used in ATEX II 3 G/D Zone 2/22 with non-sparking.

Environmental compliance

RoHS and WEEE compliance

The battery in the Model 5700 transmitter cannot be serviced or replaced by users. In compliance with RoHS (Restriction of Hazardous Substances) and WEEE (Waste Electrical and Electronic Equipment), Micro Motion provides a service for battery replacement and disposal.

Physical specifications

For transmitters integrally mounted to a sensor, you may need to add the weight of the transmitter to the sensor. Refer to the sensor product data sheet.

Materials of construction

Where 4-wire cable is required, Micro Motion recommends the use of Micro Motion 4-wire cable, depending on the specific model number ordered, 10 ft (3 m) of shielded PVC cable (4-wire or 9-wire) will be included (see ordering information for details). For longer cable lengths, contact Micro Motion.

Specification	Value
Housing	■ Polyurethane-painted cast aluminum
Weight	■ Painted aluminum, 4-wire and 9-wire remote: 14.2 lb (6.44 kg) ■ Painted aluminum integral: 11 lb (4.99 kg)
Terminal compartments	■ Output terminals are physically separated from the power and service-port terminals
Cable gland entrances	■ 4-wire remote: Either 5 M20 conduit entries or 5 1/2”-14 NPT ■ 9-wire remote: 1 3/4”-14 NPT female conduit port for sensor cable and for power and I/O for one of the following entries: - 4 M20 conduit entries - 4 1/2” NPT conduit entries
Mounting	■ Integral or remote mounting options ■ May be remotely connected to any 4-wire or 9-wire Micro Motion sensor ■ Remote-mount transmitters include a 304L and a 316L stainless steel mounting bracket, and the hardware for installing the transmitter on the mounting bracket ■ For remote 4-wire or 9-wire mounts, the transmitter can be rotated 360 degrees with respect to customer wall or pipe in 90-degree increments ■ For integral mount, the transmitter can be rotated with respect to the sensor in 45-degree increments

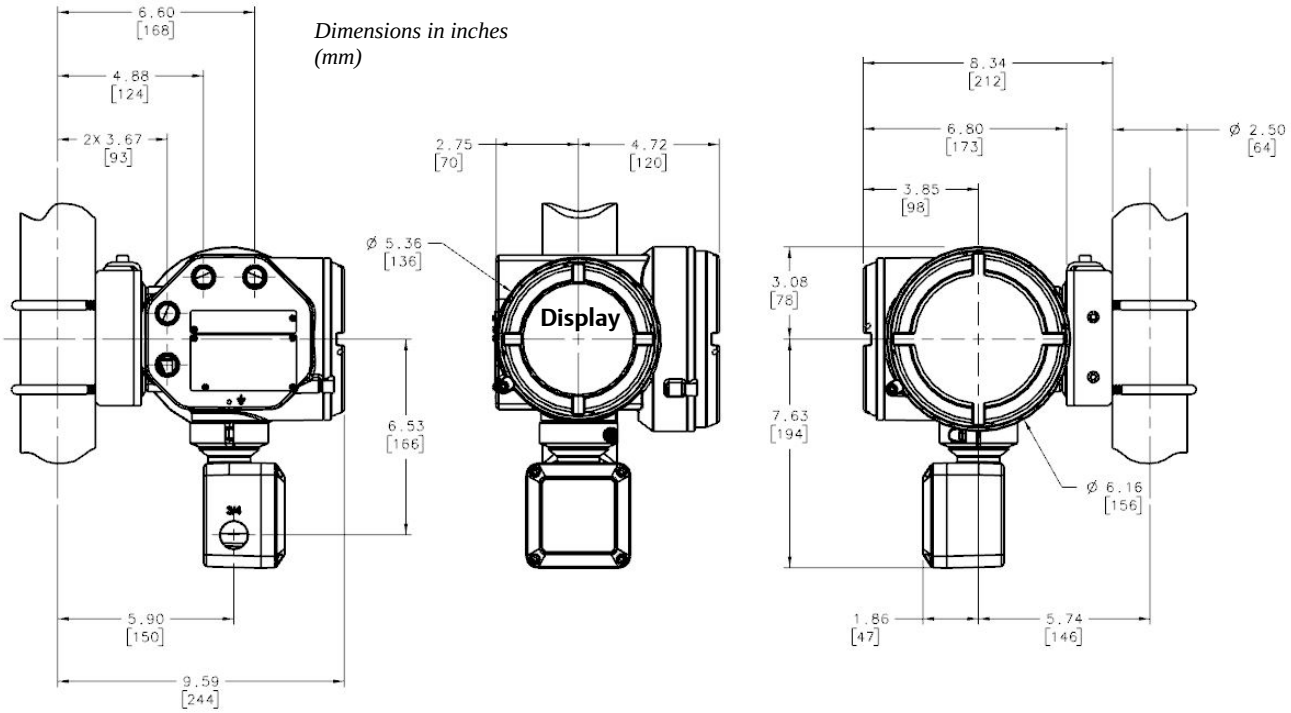
Specification	Value		
Maximum cable lengths between sensor and transmitter	**Cable type**	**Wire gauge**	**Maximum length**
	Micro Motion 9-wire	Not applicable	1000 feet (300 meters)(1)
	Micro Motion 4-wire	Not applicable	1000 feet (300 meters)
	User-supplied 4-wire	VDC 22 AWG (0.34 mm^2)	300 feet (90 meters)
		VDC 20 AWG (0.5 mm^2)	500 feet (150 meters)
		VDC 18 AWG (0.8 mm^2)	1000 feet (300 meters)
		RS-485 22 AWG (0.34 mm^2) or larger	1000 feet (300 meters)
	For the cable sizing formula, see the *Micro Motion® Model 5700 Transmitters Quick Installation Guide*.		
Standard interface/display	■ Graphical backlit display with 4-button optical controls and flowmeter-status LED ■ Depending on purchase option, transmitter housing cover has either a non-glass lens or tempered glass lens option ■ To facilitate various mounting orientations, the display can be rotated on transmitter, 360 degrees, in 90-degree increments ■ Display supports English, German, French, Spanish, Portuguese, Russian, Chinese, and Japanese		
Display functions	■ Complete operation and configuration through the display, no service tool required ■ View process variables ■ Start, stop, and reset totalizers ■ View and acknowledge alarms ■ View the Smart Meter Verification initiation and results from the display without interrupting process measurement ■ Set the flowmeter to zero, simulate outputs, change measurement units, configure outputs, and set RS-485 communications options ■ View a three-color LED status light on display panel that indicates flowmeter conditions at a glance		

(1) For Smart Meter Verification, the limit is 66 feet (20 meters)

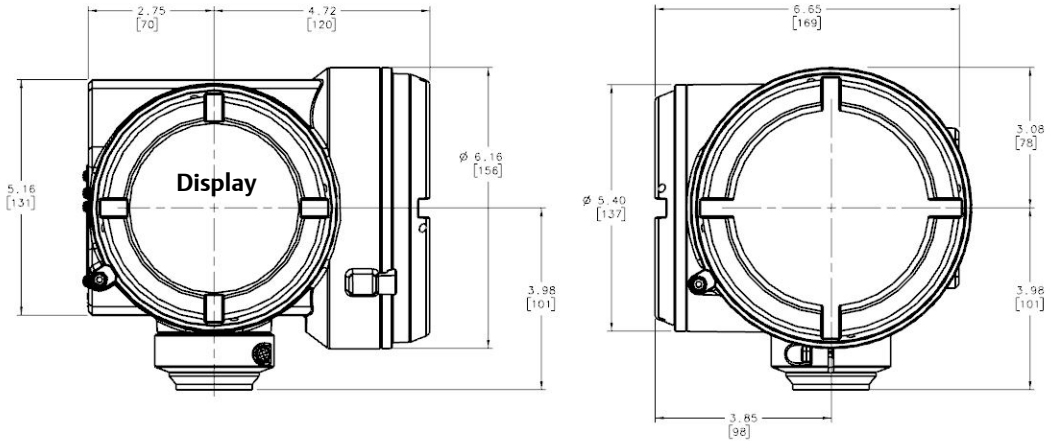
Dimensions

Remote mount transmitter

Dimensions in inches (mm)

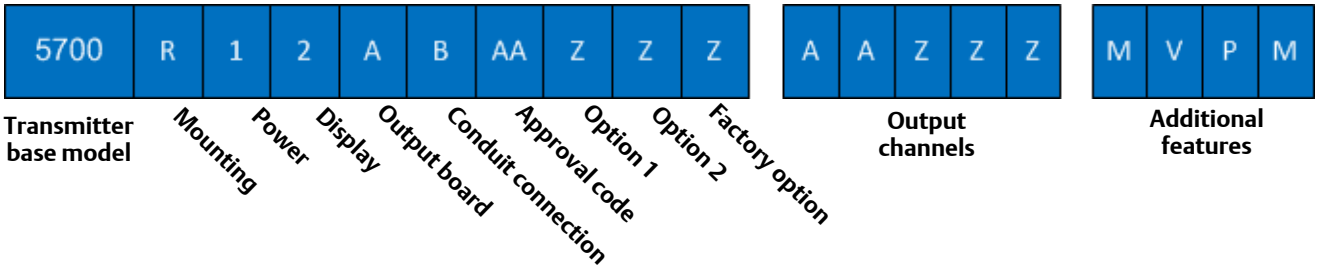


Integral mount transmitter



Ordering information

Model code structure



Base model

Model	Product description
5700	Micro Motion Coriolis field mount transmitter

Code	Mounting options
I	Integral mount transmitter
R	4-wire remote mount transmitter (includes 10 ft. [3m] 4-wire shielded PVC cable, bracket for wall or pipe mounting, and hardware for 2" pipe mount)
C	9-wire remote transmitter with integrated core processor (includes 10 ft. [3m] 9-wire CFEPS cable, bracket for wall or pipe mounting, and hardware for 2" pipe mount)

Code	Power options
1	18 to 100 VDC or 85 to 265 VAC; self switching

Code	Display options
2	Back lit graphic display for CSA, UL, and IIB + H_2 ATEX, and IECEx ratings
3	No display
5	Back lit graphic display for IIC ATEX, IECEx, and NEPSI rating

Code	Output hardware board options
A	Configurable outputs

Code	Conduit connection options
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	Approval options
MA	Micro Motion Standard (no approval)
AA	CSA (US and Canada): Class I, Division 1, Groups C and D
FA	ATEX: II 2G, Ex db, Zone 1 and II 2D Ex tb, Zone 21
IA	IECEx: EPL Gb, Ex db, Zone 1 and EPL Db Ex tb, Zone 21
2A	CSA (US and Canada): Class I, Division 2, Groups A, B, C, D; sensor connections will be intrinsically safe without additional barrier
VA (integral only)	ATEX: II 3G, Ex nA nC, Zone 2 and II 3D Ex tc Zone 22
3A (integral only)	IECEx: EPL Gc, Ex nA nC, Zone 2

Code	Transmitter option 1
Z	Standard product

Code	Transmitter option 2
Z	Standard product

Code	Factory options
Z	Standard product
X	ETO product

Channel	Code	Output channel assignment
A	Z	Off
	A	On; mA output with HART
B	Z	Off
	A	On; Configurable to mA output, frequency output, and discrete output
C	Z	Off
	A	On; Configurable to mA output, frequency output, discrete output, and discrete input
D	Z	Off
	A	On; Configurable to mA input, frequency input, frequency output, discrete output, and discrete input
E	Z	Off
	A	On; RS-485 Modbus and RS-485 HART

Code	Additional features (all optional)
Instrument tagging	
TG	Customer information required (maximum 24 characters)
Meter verification	
MV	Smart Meter Verification
Enhanced measurement (select only one)	
PS	API Referral software
CM	Concentration Measurement software
Additional software options; select only one from this group	
BS	Batching Software package
PG	Advanced Phase Measurement for wet gas
PL	Advanced Phase Measurement for single liquid and gas
PA	Advanced Phase Measurement software for three-phase measurement and Net-Oil Computer (NOC)

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