

**Product Data Sheet**

PS-00830, Rev. B

October 2006

# Micro Motion<sup>®</sup> Model 2400S Transmitters

Next-generation MVD<sup>™</sup> technology

- Compact space-saving design
- High-speed DSP processing
- Extensive built-in diagnostics
- Easy configuration and startup
- On-board meter verification



# Micro Motion® Model 2400S transmitters

The Model 2400S transmitter provides next-generation performance in an innovative, compact package. Difficult applications become easy with ultra-fast meter response time, the ability to handle high degrees of air entrainment, and built-in smart diagnostics that alert you to problems before they impact your process.

The Model 2400S transmitter features Micro Motion MVD™ technology and provides cutting-edge features such as meter verification. A simple button-push tells you if measurement baselines have changed from their original state—with no need to remove the sensor from the line or spend thousands of dollars on secondary references.



Installing and using the Model 2400S is easy. Because the Model 2400S comes integrally mounted on an ELITE® sensor, installation and commissioning are a snap. The optional display shows process variables and diagnostics at a glance. Optical “buttons” allow you to configure and manage the transmitter without removing the cover, and wireless IrDA connectivity allows full configuration without the need for cables.

The Model 2400S transmitter is available with a range of communication options: dual I/O analog channels, or digital communication with PROFIBUS-DP or DeviceNet™ protocols.

High quality, robust measurement, and unsurpassed installation performance have long been Micro Motion trademarks. The Model 2400S raises the bar even higher by providing outstanding out-of-the-box performance unequaled by any other manufacturer or technology.

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# Physical specifications

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Housing	NEMA 4X (IP67) polyurethane-painted cast aluminum. Available with 1/2" NPT or M20 conduit connections.
Weight	Transmitter is mounted integrally with sensor. For total weight, see product data sheet for sensor.
Mounting and cabling	Model 2400S transmitters are mounted integrally with sensor. The transmitter can be rotated on the sensor up to 360° in 45° increments.

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# Electrical connections

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<b>Model 2400S Analog</b>	
Input and output connections	Two pairs of wiring terminals for transmitter inputs/outputs. Screw terminals accept solid or stranded conductors, 0,14 to 2,5 mm <sup>2</sup> .
Power connections	One pair of wiring terminals accepts AC or DC power. One internal ground lug for power supply ground wiring. Screw terminals accept solid or stranded conductors, 0,14 to 2,5 mm <sup>2</sup> .
Digital communications maintenance connections	Two clips for temporary connection to the service port. Two clips for temporary connection to HART/Bell 202 terminals.
<b>Model 2400S PROFIBUS-DP</b>	
PROFIBUS-DP segment	One pair of wiring terminals for connection to PROFIBUS-DP segment. Connection type: Five-pin PROFIBUS-DP M12 (Eurofast) female connector (optional). Termination through pins 1 and 3. One pair of terminals for termination resistors
Power connections	One pair of wiring terminals accepts AC or DC power. One internal ground lug for power supply ground wiring. Screw terminals accept solid or stranded conductors, 0,14 to 2,5 mm <sup>2</sup> .
Digital communications maintenance connections	Two clips for temporary connection to the service port.
<b>Model 2400S DeviceNet</b>	
DeviceNet segment	One pre-installed male 5-pin Eurofast connector for I/O and power supply wiring.
Digital communications maintenance connections	Two clips for temporary connection to the service port.

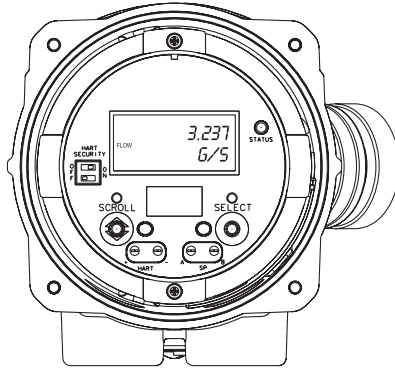
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# User interface

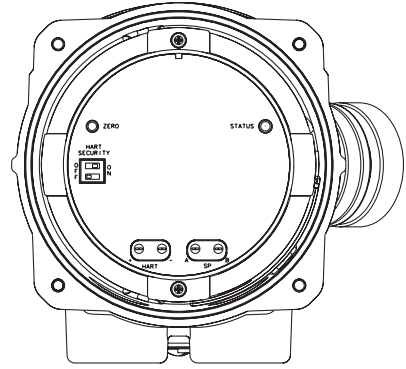
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## Model 2400S Analog

With display

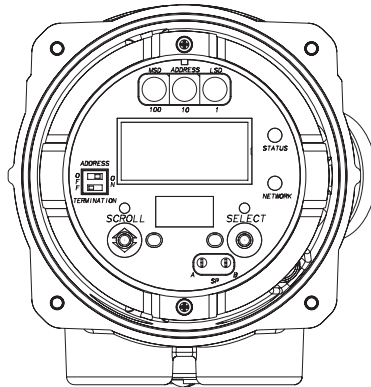


Without display

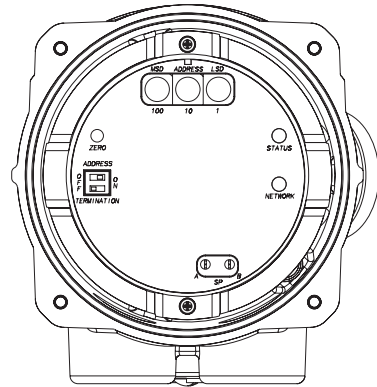


## Model 2400S PROFIBUS-DP

With display

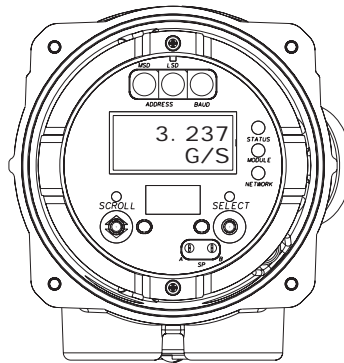


Without display

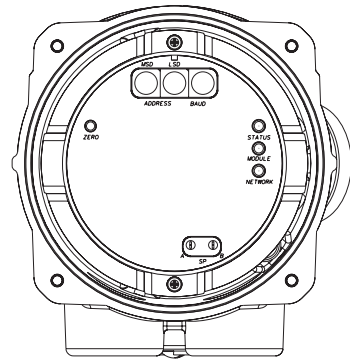


## Model 2400S DeviceNet

With display



Without display



## User interface *continued*

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<b>Interface functions</b>	
All models with or without display	<ul style="list-style-type: none"><li>• Suitable for hazardous area installation.</li><li>• User interface module can rotate 360° on the transmitter in 90° increments.</li><li>• Three-color status LED on user interface module indicates flowmeter condition at a glance, using a solid green, yellow or red light. Zero in progress is indicated by a flashing yellow light.</li><li>• Two clips for service port connections (requires removing transmitter housing cover).</li></ul>
Model 2400S Analog with or without display	<ul style="list-style-type: none"><li>• Two clips for HART/Bell 202 connections (requires removing transmitter housing cover).</li><li>• HART security switch (requires removing transmitter housing cover).</li></ul>
Model 2400 DeviceNet, with or without display	<ul style="list-style-type: none"><li>• Three rotary switches for selecting network address and baud rate.</li></ul>
Model 2400 PROFIBUS-DP, with or without display	<ul style="list-style-type: none"><li>• Three rotary switches for selecting network address.</li><li>• DIP switches for address and enabling internal termination resistor.</li></ul>
All models with display	<ul style="list-style-type: none"><li>• Depending on purchase option, transmitter housing cover has glass or plastic lens.</li><li>• User interface module includes LCD panel. LCD line 1 displays process variable; line 2 displays engineering unit of measure.</li><li>• Display update rate is user-configurable: 1 to 10 seconds at 1-second increments.</li><li>• Display backlighting may be adjusted or turned off.</li><li>• Operator access to transmitter menus is provided via optical switches that are operated through the lens. LED indicators show when a “button” has been pressed.</li><li>• Infrared port allows access to service port from IrDA device (e.g., PDA running Pocket ProLink) without removing transmitter housing cover.</li></ul>
All models without display	<ul style="list-style-type: none"><li>• Transmitter housing cover is all metal (no lens).</li><li>• Access to user interface requires removing transmitter housing cover.</li><li>• Zero button allows flowmeter zero from field (requires removing transmitter housing cover).</li><li>• No IrDA.</li></ul>

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## Power supply

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Model 2400S Analog and Model 2400S PROFIBUS-DP	<ul style="list-style-type: none"><li>• Self-switching AC/DC input, automatically recognizes supply voltage.</li><li>• Complies with low voltage directive 73/23/EEC per IEC 61010-1.</li><li>• Installation (Overvoltage) Category II, Pollution Degree 2.</li><li>• AC: 85–265 VAC; 50/60 Hz; 4 watts typical, 7 watts maximum</li><li>• DC: 18–100 VDC; 4 watts typical, 7 watts maximum</li><li>• Fuse: IEC 127-1,25 fuse, slow blow</li></ul>
Model 2400S DeviceNet	Powered by DeviceNet connection in accordance with DeviceNet specification.

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# Input/output signals

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## Model 2400S Analog

### Channel A

One active or passive 4–20 mA output

- Not intrinsically safe
  - Isolated to  $\pm 50$  VDC from all other outputs and earth ground
  - Maximum load limit: 820 ohms
  - External (passive) power: 12 to 30 VDC, 24 VDC typical
  - Can report mass flow, volume flow, density, temperature, or drive gain
  - Output is linear with process from 3,8 to 20,5 mA, per NAMUR NE43 (June 1994)
- 

### Channel B (configurable)

One active or passive frequency/pulse output

- Not intrinsically safe
- Can report mass flow or volume flow, which can be used to indicate flow rate or total
- Scalable to 10000 Hz
- Power:
  - Internal (active): +24 VDC  $\pm 3\%$  with a 2,2 kohm internal pull-up resistor
  - External (passive): +30 VDC maximum, +24 VDC typical
- Output is linear with flow rate to 12500 Hz

One active or passive discrete output

- Not intrinsically safe
- Can report events 1–5, flow switch, forward/reverse flow, calibration in progress, or fault
- Power:
  - Internal (active): +24 VDC  $\pm 3\%$  with a 2,2 kohm internal pull-up resistor
  - External (passive): +30 VDC maximum, +24 VDC typical
- Maximum sink capability: 500 mA

One active or passive discrete input

- Not intrinsically safe
  - Power:
    - Internal (active): +24 VDC, 10 mA maximum source current
    - External (passive): +3 to 30 VDC maximum
  - Can report reset all totals, reset mass total, reset volume total, or start sensor zero
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## Model 2400S PROFIBUS-DP

Digital 2-way PROFIBUS-DP signal

## Model 2400S DeviceNet

Digital 2-way DeviceNet signal

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# Digital communications

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## All Versions

Service port One service port for temporary connections (requires removing transmitter housing cover)  
Uses RS-485 Modbus signal, 38,4 kilobaud, one stop bit, no parity  
Address: 111 (not configurable)

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## Wireless

If transmitter has display, service port can be accessed via IrDA (for example, with a PDA running Pocket ProLink) without removing transmitter housing cover.

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## Model 2400S Analog

### HART/Bell 202

HART signal is superimposed on the primary milliamp output, and is available for host system interface:

- Frequency: 1,2 and 2,2 kHz
  - Amplitude: to 1,0 mA
  - 1200 baud, one stop bit, odd parity
  - Address: 0 (default), configurable
  - Requires 250 to 600 Ohm resistance
- 

## Model 2400S PROFIBUS-DP

### PROFIBUS-DP

Digital 2-way communication protocol

- Automatically recognizes network baud rate
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## Model 2400S DeviceNet

### DeviceNet

Digital 2-way communication protocol

- Baud rate and address selectable by 3 rotary switches
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# Host interface

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<b>Model 2400S Analog</b>	Micro Motion ProLink® II v2.5 (or later) supports all functionality. DD file for 375 Field Communicator supports all functionality.
<b>Model 2400S PROFIBUS-DP</b>	ProLink II v2.5 from Micro Motion supports basic device configuration. Siemens Simatic PDM required for complete device configuration. Supplied with transmitter: <ul style="list-style-type: none"><li>• GSD file conforming to the PROFIBUS-DP specification<ul style="list-style-type: none"><li>- Provides PROFIBUS Class 1 Master functions</li><li>- Enables reading and controlling all process data</li></ul></li><li>• DD file conforming to PROFIBUS EDDL specification<ul style="list-style-type: none"><li>- Provides PROFIBUS Class 2 Master functions</li><li>- Enables device configuration</li></ul></li></ul>
<b>Model 2400S DeviceNet</b>	ProLink II v2.5 from Micro Motion supports basic device configuration. <ul style="list-style-type: none"><li>• EDS file conforming to the DeviceNet specification<ul style="list-style-type: none"><li>- Enables device configuration</li></ul></li></ul>

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# Environmental limits

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Ambient temperature limits	Operating and storage: –40 to +60 °C Below –20 °C, LCD responsiveness decreases and LCD may become difficult to read. Above 55 °C, some darkening of the LCD panel might occur. ATEX requires limiting ambient temperature to below 55 °C.
Humidity limits	5 to 95% relative humidity, non-condensing at 60 °C
Vibration limits	Meets IEC68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1,0 g

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# Ordering information

<b>Model</b>	<b>Product description</b>
2400S	Micro Motion Coriolis MVD transmitter
<b>Code</b>	<b>Mounting/housing material</b>
I	Integral mount transmitter / Polyurethane-painted aluminum
<b>Code</b>	<b>Output options / Power supply</b>
A	One mA, one configurable output (18 to 100 VDC and 85 to 265 VAC, self-switching)
C <sup>(1)</sup>	DeviceNet (bus powered)
D	PROFIBUS-DP (18 to 100 VDC and 85 to 265 VAC; self switching)
<b>Code</b>	<b>I/O terminations</b>
1	Compression screw terminals
2 <sup>(2)</sup>	Cage clamp terminals
<b>Code</b>	<b>Display</b>
1	Dual line display for process variables and totalizer reset, glass lens
3	No display
4 <sup>(3)</sup>	Dual line display for process variables and totalizer reset, non-glass lens
<b>Code</b>	<b>Conduit connections</b>
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
L	DeviceNet 5-pin Eurofast connector in M20 housing
M	DeviceNet 5-pin Eurofast connector in 1/2" NPT housing
<b>Code</b>	<b>Approvals</b>
M	Micro Motion standard (no approval)
2	CSA Class I Div. 2 (U.S.A and Canada)
L	ATEX II 3 G/D, Zone 2
3 <sup>(4)</sup>	IECEX, Zone 2
Continued on next page	

- (1) Requires selecting conduit connection option L or M.  
 (2) Not available with output/power supply options C or D.  
 (3) Not available with approval codes 2, L, or 3.  
 (4) Available only with output/power option code A.

## Ordering information *continued*

Code	Language
A	Danish installation manual and English configuration manual
D	Dutch installation manual and English configuration manual
E	English installation manual and English configuration manual
F	French installation manual and French configuration manual
G	German installation manual and German configuration manual
H	Finnish installation manual and English configuration manual
I	Italian installation manual and English configuration manual
N	Norwegian installation manual and English configuration manual
P	Portuguese installation manual and English configuration manual
S	Spanish installation manual and Spanish configuration manual
W	Swedish installation manual and English configuration manual
C	Czech CE requirements, English installation manual, and English configuration manual
B	Hungarian CE requirements, English installation manual, and English configuration manual
K	Slovak CE requirements, English installation manual, and English configuration manual
T	Estonian CE requirements, English installation manual, and English configuration manual
O	Polish CE requirements, English installation manual, and English configuration manual
U	Greek CE requirements, English installation manual, and English configuration manual
L	Latvian CE requirements, English installation manual, and English configuration manual
V	Lithuanian CE requirements, English installation manual, and English configuration manual
Y	Slovenian CE requirements, English installation manual, and English configuration manual
Code	Software options 1
Z	Flow and density variables (standard)
G <sup>(1)</sup>	Enhanced density measurement
A <sup>(1)</sup>	Petroleum measurement
Code	Software options 2
Z	No software options 2
C	Meter verification, structural integrity method
Code	Factory options
Z	Standard product
X	ETO product
<b>Typical model number: 2400S I A 1 1 B M E Z C Z</b>	

(1) Software options A and G are available only with output option codes C and D.

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