

Micro Motion™ Model 2400S Transmitters

Installation Manual



Safety and approval information

This Micro Motion product complies with all applicable European directives when properly installed in accordance with the instructions in this manual. Refer to the EC declaration of conformity for directives that apply to this product. The EC declaration of conformity, with all applicable European directives, and the complete ATEX Installation Drawings and Instructions are available on the internet at www.emerson.com/flowmeasurement or through your local Micro Motion support center.

Information affixed to equipment that complies with the Pressure Equipment Directive can be found on the internet at www.emerson.com/flowmeasurement.

For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

Other information

Full product specifications can be found in the product data sheet. Troubleshooting information can be found in the transmitter configuration manual. Product data sheets and manuals are available from the Micro Motion web site at www.emerson.com/flowmeasurement.

Return policy

Micro Motion procedures must be followed when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Micro Motion employees. Failure to follow Micro Motion procedures will result in your equipment being refused delivery.

Information on return procedures and forms is available on our web support system at www.emerson.com/flowmeasurement, or by phoning the Micro Motion Customer Service department.

Micro Motion customer service

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- Worldwide: flow.support@emerson.com
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Argentina	+54 11 4809 2700	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	+39 8008 77334	China	+86 21 2892 9000
Chile	+56 2 2928 3800	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
Peru	+51 15190130	Russia/CIS	+7 495 995 9559	South Korea	+82 2 3438 4600
		Egypt	0800 000 0015	Singapore	+65 6 777 8211
		Oman	800 70101	Thailand	001 800 441 6426
		Qatar	431 0044	Malaysia	800 814 008
		Kuwait	663 299 01		
		South Africa	800 991 390		
		Saudi Arabia	800 844 9564		
		UAE	800 0444 0684		

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1 Before you begin

This manual describes the procedures required to install the following transmitters:

- Model 2400S transmitter with analog outputs
- Model 2400S transmitter with PROFIBUS-DP
- Model 2400S transmitter with DeviceNet™

1.1 Safety

Read each safety message in this document carefully before proceeding to the next step.

⚠ WARNING!

Improper installation in a hazardous area can cause an explosion. For information about hazardous applications, refer to the appropriate Micro Motion approval documentation, shipped with the meter or available from the Micro Motion web site.

⚠ CAUTION!

Shut off power before installing the transmitter. Excess voltage can damage the transmitter.

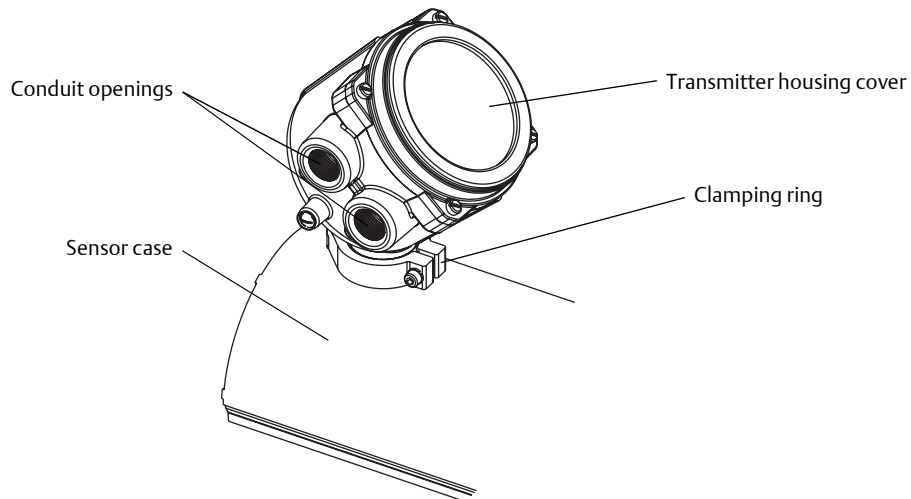
⚠ CAUTION!

Follow all instructions. Improper installation could cause measurement error or flowmeter failure.

1.2 Flowmeter components

The Model 2400S transmitter is mounted on a Micro Motion sensor. The transmitter and sensor together comprise the Micro Motion flowmeter.

Figure 1-1 provides a view of the Model 2400S transmitter mounted on a sensor.

Figure 1-1 Model 2400S transmitter

1.3 Transmitter installation overview

The Model 2400S transmitter component is mounted integrally with the sensor and grounded via the sensor. To install and ground the sensor, see the sensor documentation. Additional transmitter installation steps are documented in this manual:

- Rotate the transmitter on the sensor (optional)
See [Section 2](#).
- Rotate the user interface module on the transmitter (optional)
See [Section 2](#).
- Wire and ground the transmitter's power supply
See [Section 2](#).
- Wire the transmitter I/O:
 - For the Model 2400S Analog transmitter, see [Section 3](#)
 - For the Model 2400S PROFIBUS-DP and DeviceNet transmitters, see [Section 4](#)

1.4 Flowmeter documentation

Table 1-1 Flowmeter documentation resources

Topic	Document
Sensor installation	Sensor documentation shipped with the sensor
Hazardous area installation	See the approval documentation shipped with the transmitter, or download the appropriate documentation from the Micro Motion web site at www.emerson.com/flowmeasurement .
Transmitter configuration, flowmeter startup and use, and flowmeter troubleshooting	<ul style="list-style-type: none">■ <i>Micro Motion Model 2400S Transmitters with Analog Outputs: Configuration and Use Manual</i>■ <i>Micro Motion Model 2400S Transmitters with PROFIBUS-DP: Configuration and Use Manual</i>■ <i>Micro Motion Model 2400S Transmitters with DeviceNet: Configuration and Use Manual</i>

2 Transmitter orientation and power supply

This section describes:

- Rotating the transmitter on the sensor (optional)
- Rotating the user interface module on the transmitter (optional)
- Power supply requirements and wiring

2.1 Moisture protection

When rotating or wiring the transmitter, guard against condensation or excessive moisture inside the transmitter housing. Be sure that the conduit openings are completely sealed after you perform all installation and wiring procedures.

⚠ CAUTION!

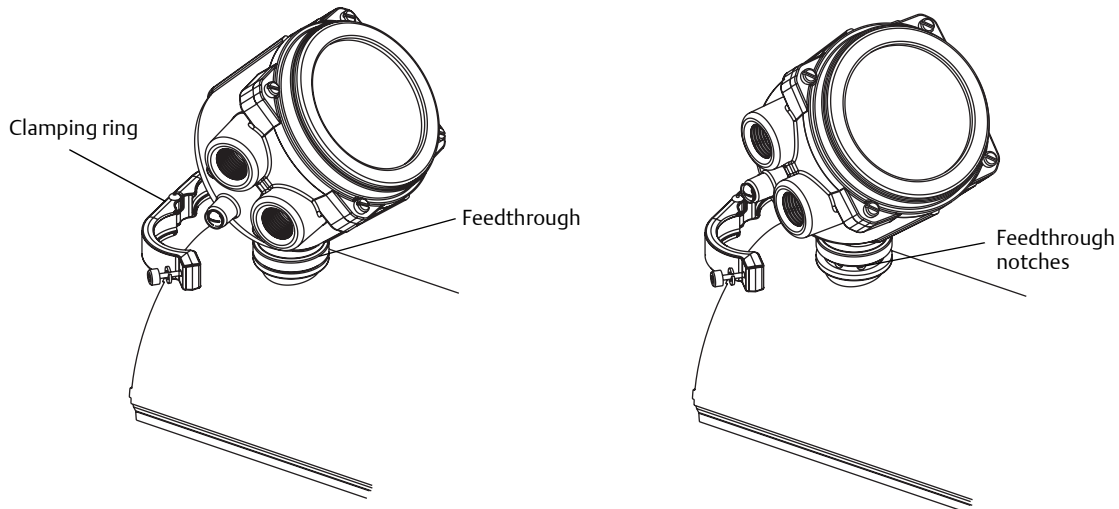
Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Install the meter so that the conduit openings do not point upward, and install drip legs in conduit or cable. Inspect and grease all gaskets and O-rings. Fully close and tighten all housing covers and conduit openings.

2.2 Rotating the transmitter on the sensor (optional)

For easier access to the user interface or the wiring terminals, the transmitter can be rotated on the sensor in 45° increments, for eight different orientations.

To rotate the transmitter on the sensor:

1. Unscrew the clamp that holds the transmitter to the feedthrough.
See [Figure 2-1](#).
2. Gently lift the transmitter on the feedthrough until it disengages from the notches on the feedthrough. You will not be able to remove the transmitter completely.
3. Rotate the transmitter to the desired position.
4. Lower the transmitter, sliding it onto the notches on the feedthrough.
5. Replace the clamp and tighten the screw.

Figure 2-1 Rotating the transmitter on the sensor**⚠ CAUTION!**

Do not rotate the housing more than 360°. Excessive rotation can damage the wiring and cause measurement error or flowmeter failure.

2.3 Rotating the user interface module on the transmitter (optional)

For easier access, you can rotate the user interface module (whether or not the transmitter has an LCD display) up to 360° in 90° increments.

⚠ WARNING!

Shut off power to the transmitter before you remove the housing cover in a hazardous area, as this could cause an explosion.

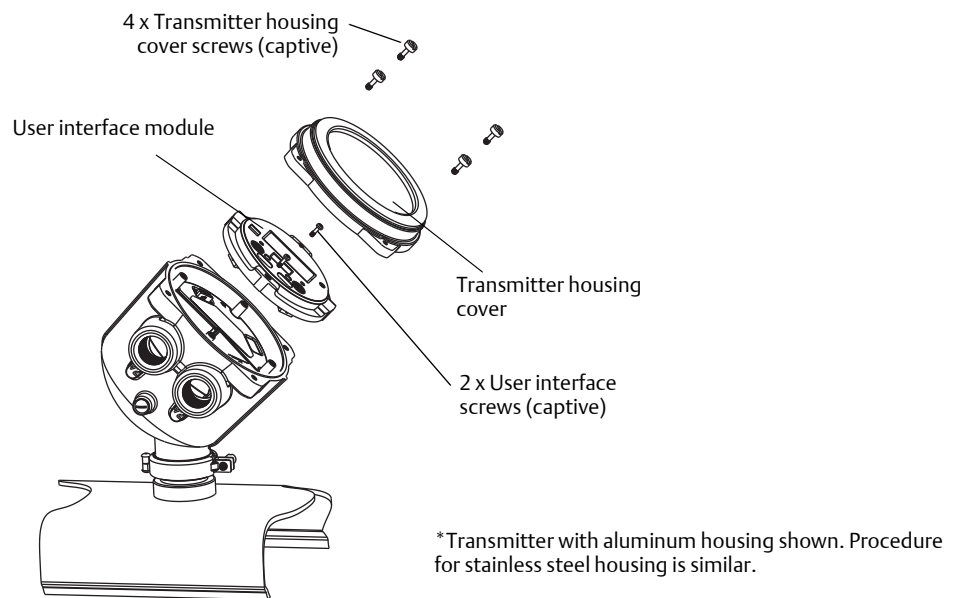
To rotate the user interface module on the transmitter:

1. Remove power from the unit.

2. Remove the transmitter housing cover and user interface module using the following steps (see [Figure 2-2](#)).
 - a. Loosen the four transmitter housing cover screws.
 - b. Remove the transmitter housing cover.
 - c. Loosen the 2 user interface screws.
 - d. Gently lift the user interface module, disengaging it from the user interface connector on the transmitter.
3. Rotate the user interface module to the desired position and plug it into the user interface connector on the transmitter.

Four user interface connectors are located on the back of the user interface module. See [Figure 2-3](#) for another view of the user interface connector on the transmitter.
4. Tighten the user interface screws.
5. Replace the transmitter housing cover and tighten the transmitter housing cover screws.
6. Restore power to the transmitter if required.

Figure 2-2 Rotating the user interface module on the transmitter



2.4 Power supply requirements

Model 2400S Analog and Model 2400S PROFIBUS-DP transmitters can accept either AC or DC power. The transmitter automatically recognizes the source voltage. Power supply requirements are:

- AC power:
 - 85–265 VAC
 - 50/60 Hz
 - 4 watts typical, 7 watts maximum
- DC power:
 - 18–100 VDC
 - 4 watts typical, 7 watts maximum

The Model 2400S DeviceNet transmitter is powered from the DeviceNet network per the DeviceNet specification. There is no need to connect separate power-supply wiring for the Model 2400S DeviceNet transmitter. Skip to [Section 4](#).

2.5 DC power requirements for Model 2400S Analog and PROFIBUS-DP transmitters

If you are using DC power with a Model 2400S Analog or PROFIBUS-DP transmitter, the following requirements apply:

- At startup, the transmitter power source must provide a minimum of 1 A of short-term current per transmitter.
- Length and conductor diameter of the power cable must be sized to provide 18 VDC minimum at the power terminals, at a load current of 0.5 A. (This assumes a single transmitter per cable. Connecting multiple transmitters to a single cable should generally be avoided.) To size the cable, see [Table 2-1](#) and use the following formula as a guideline:

$$\text{MinimumSupplyVoltage} = 18\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.5\text{A})$$

Table 2-1 Typical power cable resistances at 68 °F (20 °C)

Gauge	Resistance ⁽¹⁾
14 AWG	0.0050 W/foot
16 AWG	0.0080 Ω/foot
18 AWG	0.0128 Ω/foot
20 AWG	0.0204 Ω/foot
2,5 mm ²	0,0136 Ω/meter
1,5 mm ²	0,0228 Ω/meter
1 mm ²	0,0340 Ω/meter
0,75 mm ²	0,0460 Ω/meter
0,5 mm ²	0,0680 W/meter

(1) These values include the resistance of both high and low conductors in a cable.

Example

The transmitter is mounted 350 feet from a DC power supply. If you want to use 16 AWG cable, calculate the required voltage at the DC power supply as follows:

$$\text{MinimumSupplyVoltage} = 18\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.5\text{A})$$

$$\text{MinimumSupplyVoltage} = 18\text{V} + (0.0080 \text{ Ohms/ft} \times 350 \text{ ft} \times 0.5\text{A})$$

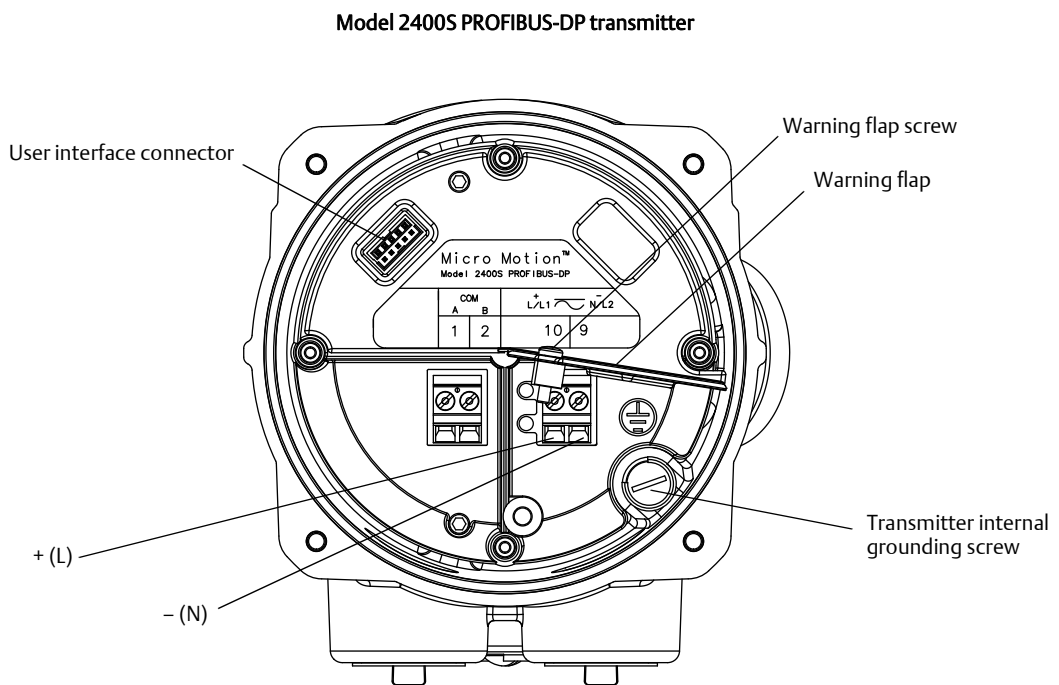
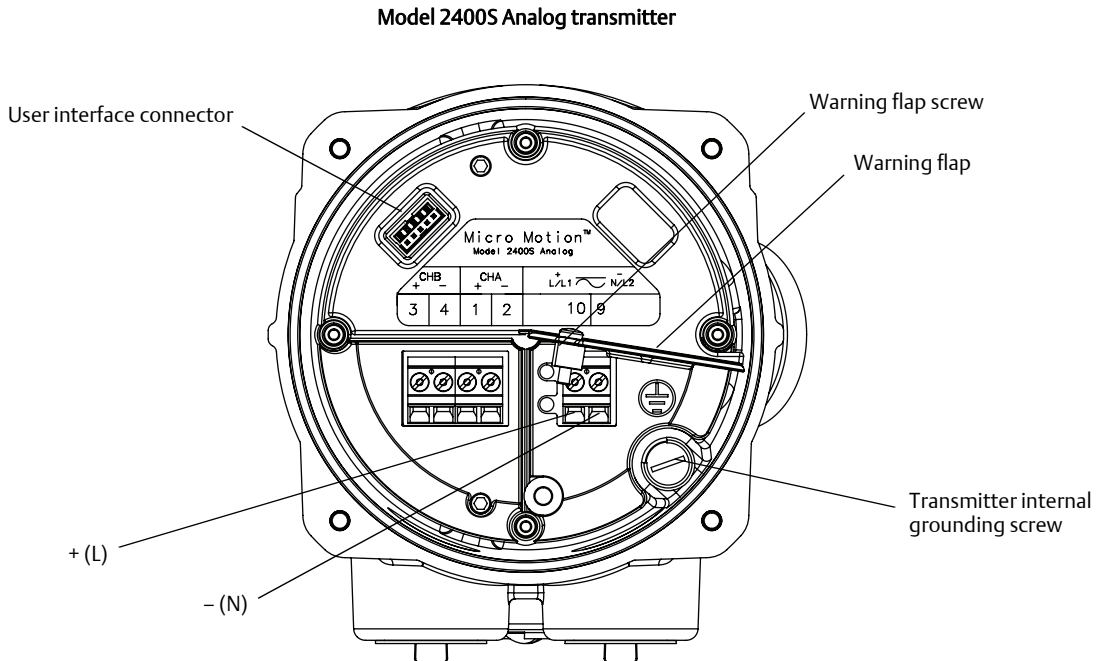
$$\text{MinimumSupplyVoltage} = 19.4\text{V}$$

2.6 Wire the power supply

To wire the power supply:

1. Remove the transmitter housing cover and user interface module as described in [Section 2.3](#).
2. Unscrew the warning flap screw and raise the warning flap. [Figure 2-3](#) shows the warning flap in the open position.
3. Connect the power supply wires to terminals 9 and 10, as shown in [Figure 2-3](#).
4. Ground the power supply to the transmitter's internal grounding screw, shown in [Figure 2-3](#).
5. Lower the warning flap and tighten the warning flap screw.
6. (Optional). Install a user-supplied switch in the power supply line. For compliance with low-voltage directive 2006/95/EC (European installations), a switch in close proximity to the transmitter is required.

Figure 2-3 Wiring the transmitter power supply



3 Analog transmitter I/O wiring

This section describes how to wire I/O for Model 2400S Analog transmitters.

Note:

To wire I/O for Model 2400S PROFIBUS-DP and DeviceNet transmitters, see [Section 4](#).

Important:

Follow all corporate, local, and national safety requirements and electrical codes.

3.1 Moisture protection

When rotating or wiring the transmitter, guard against condensation or excessive moisture inside the transmitter housing. Be sure that the conduit openings are completely sealed after completing all installation and wiring procedures.

CAUTION!

Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Install the meter so that the conduit openings do not point upward, and install drip legs in conduit or cable. Inspect and grease all gaskets and O-rings. Fully close and tighten all housing covers and conduit openings.

3.2 I/O options

[Table 3-1](#) lists the options for the transmitter's 2 I/O channels. Before wiring Channel B, ensure that you know how it will be configured. For information on configuring Channel B for function and power, see the *Micro Motion Model 2400S Transmitters with Analog Outputs: Configuration and Use Manual*.

Table 3-1 Terminal configuration options

Channel	Terminals	Function	Power	Comm
A	1 & 2	mA	Internal ⁽¹⁾ or external	HART/Bell 202
B	3 & 4	Frequency ⁽¹⁾	Internal ⁽¹⁾ or external	None
		Discrete output	Internal or external	None
		Discrete input	Internal or external	None

(1) Factory default

3.3 Wire the outputs

⚠ WARNING!

Improper installation in a hazardous area can cause an explosion. For information about hazardous applications, refer to the appropriate Micro Motion approval documentation, shipped with the meter or available from the Micro Motion web site.

⚠ CAUTION!

Shut off power before installing the transmitter. Excess voltage can damage the transmitter.

To wire the outputs:

1. Remove the transmitter housing cover and user interface module. See [Section 2.3](#).
2. Wire the outputs according to the appropriate wiring diagram:
 - For mA output wiring diagrams, see [Section 3.3.1](#).
 - For frequency output wiring diagrams, see [Section 3.3.2](#).
 - For discrete output wiring diagrams, see [Section 3.3.3](#).
 - For a discrete input wiring diagram, see [Section 3.3.4](#).
3. Replace the user interface module and transmitter housing cover.

Note:

Do not open the power compartment unless you are also wiring the power supply.

3.3.1 mA output wiring

The wiring diagrams in this section are examples of proper wiring for the Model 2400S mA output with the following options:

- Internal power:
 - Basic mA output wiring – [Figure 3-1](#)
 - HART/analog single-loop wiring – [Figure 3-2](#)
- External power:
 - Basic mA output wiring – [Figure 3-3](#)
 - HART/analog single-loop wiring – [Figure 3-4](#)
- HART multidrop wiring, internal or external power – [Figure 3-6](#)

Note:

If you plan to configure the transmitter to poll an external temperature or pressure device, you must wire the mA output to support HART communications. You can use either HART/analog single-loop wiring or HART multidrop wiring.

Figure 3-1 Basic mA output wiring with internal power

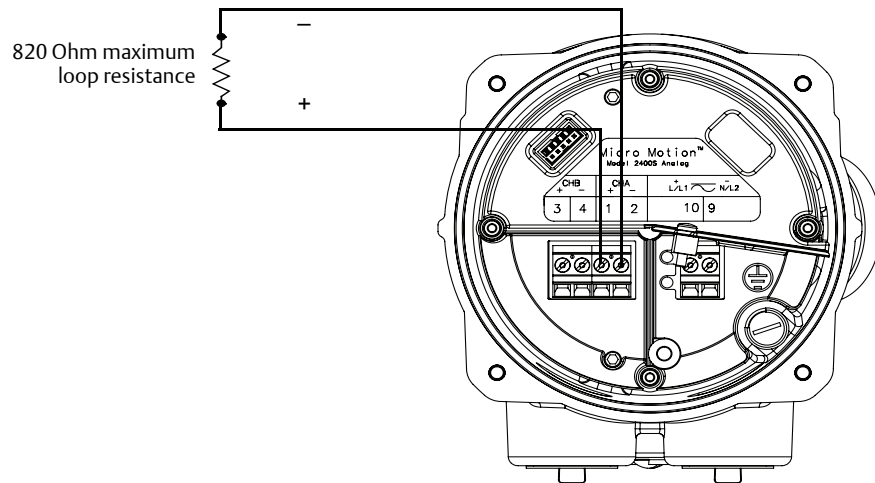
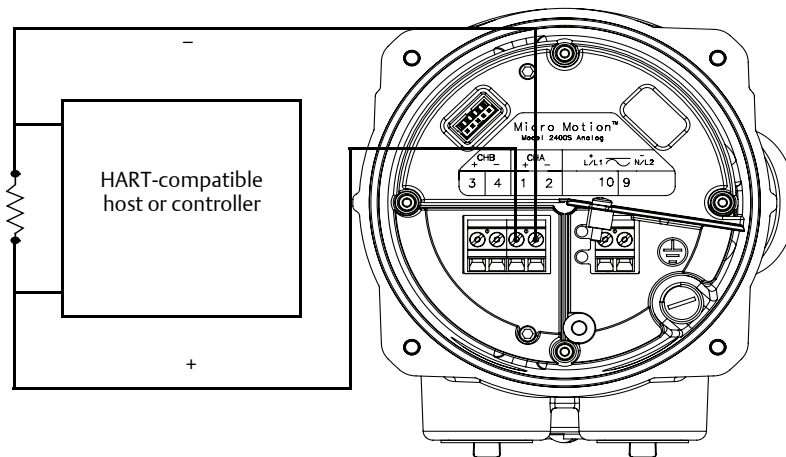


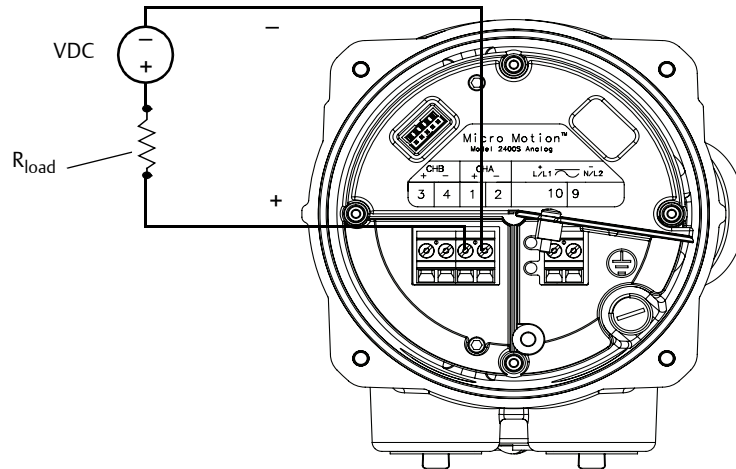
Figure 3-2 HART/analog single-loop wiring with internal power



For analog communications: 820 Ohm maximum loop resistance

For HART communications:

- 600 Ohm maximum loop resistance
- 250 Ohm minimum loop resistance

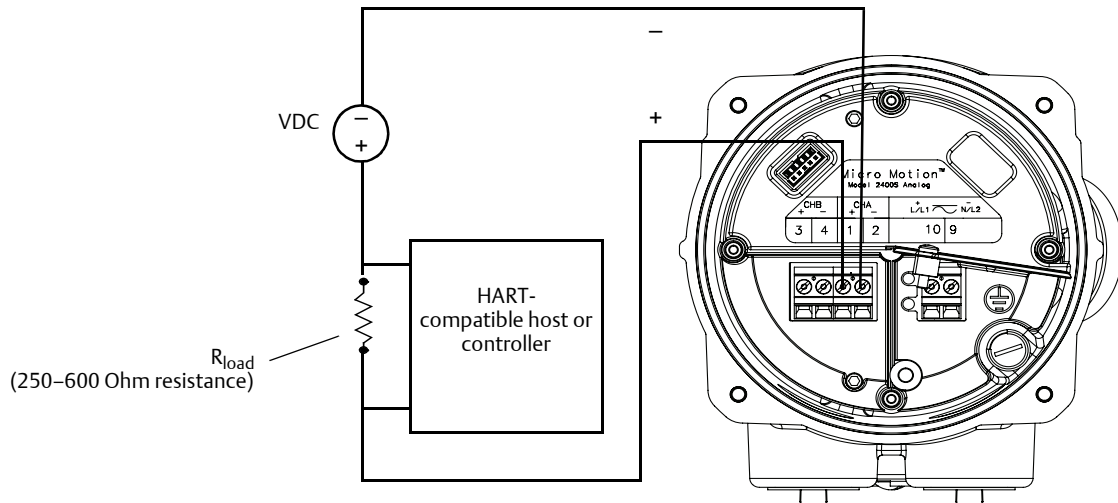
Figure 3-3 Basic mA output wiring with external power**Note:**

See [Figure 3-5](#) for voltage and resistance values.

⚠ CAUTION!

Do not exceed 30 VDC input. Terminal current must be less than 500 mA. Excessive current will damage the transmitter.

Figure 3-4 HART/analog single-loop wiring for external power



Note:

See [Figure 3-5](#) for voltage and resistance values.

Figure 3-5 Required external voltage versus mA load resistance

If communicating with HART, a minimum of 250 Ohms is required.

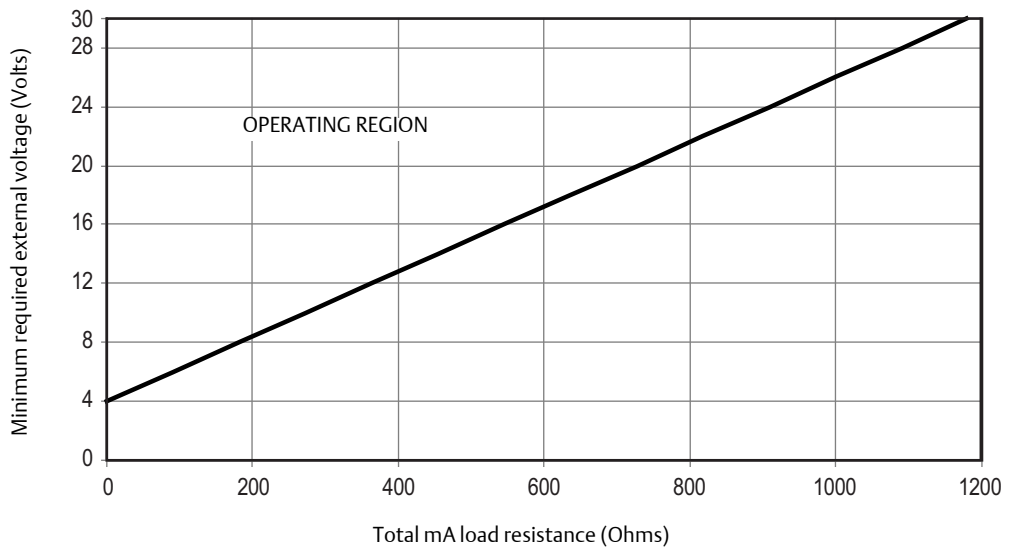
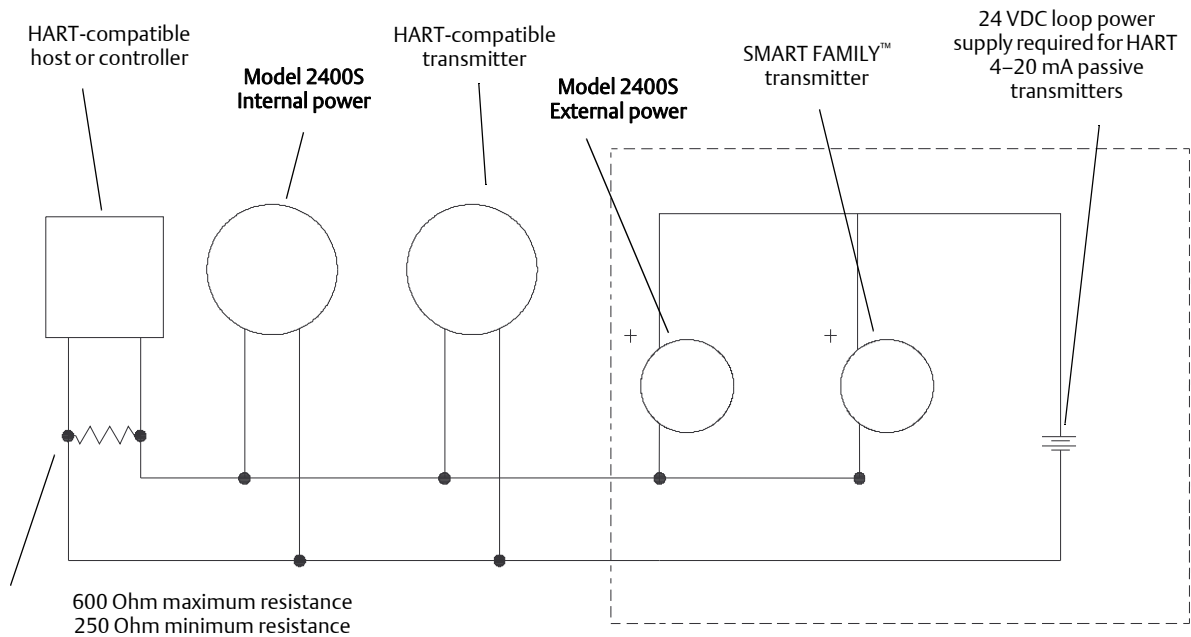


Figure 3-6 HART multidrop wiring for internal or external power**Note:**

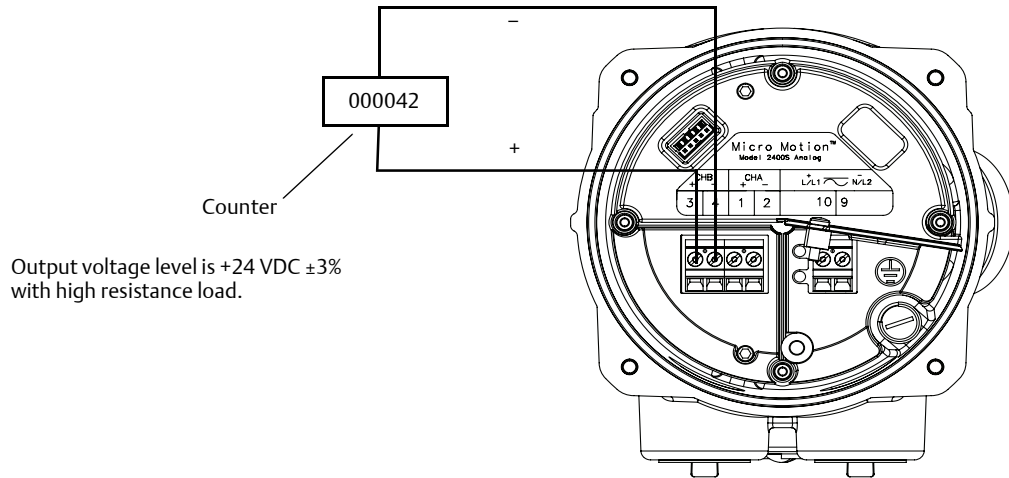
For optimum HART communication, make sure the output loop is single-point-grounded to an instrument-grade ground.

3.3.2 Frequency output wiring

Frequency output wiring depends on whether you will use internal or external power. The following diagrams are examples of proper wiring for these configurations:

- Internal power – [Figure 3-7](#)
- External power – [Figure 3-8](#)

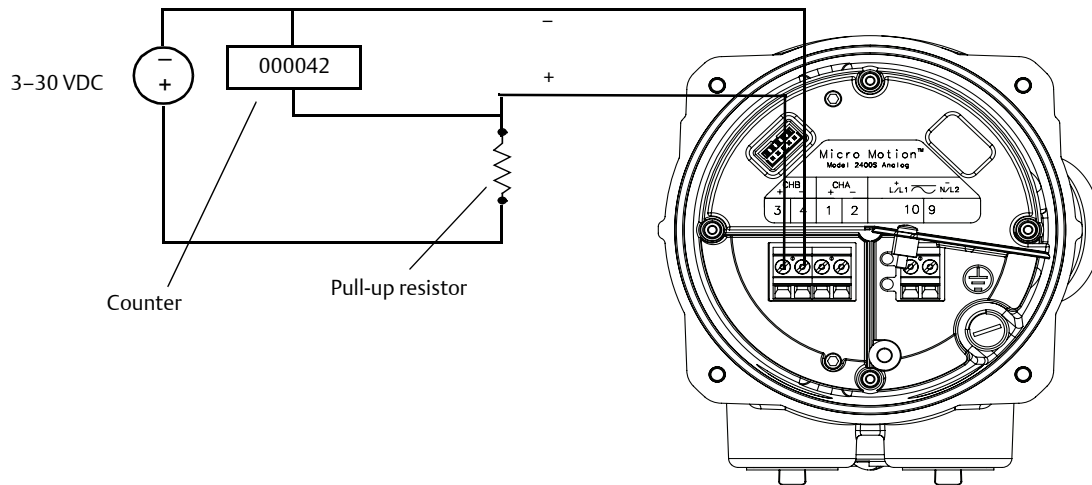
Figure 3-7 Frequency output wiring for internal power



Note:

See [Figure 3-11](#) for output voltage versus load resistance.

Figure 3-8 Frequency output wiring for external power



Note:

See [Figure 3-12](#) for recommended resistor versus supply voltage.

⚠ CAUTION!

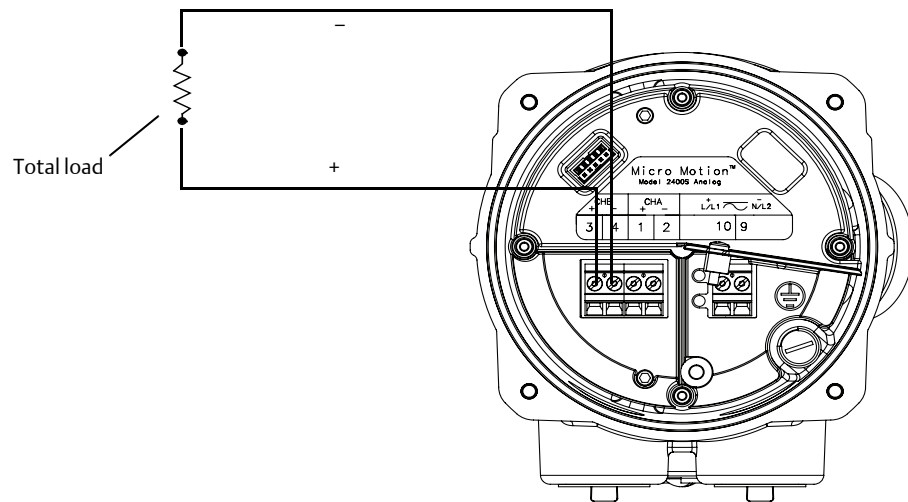
Do not exceed 30 VDC input. Terminal current must be less than 500 mA. Excessive current will damage the transmitter.

3.3.3 Discrete output wiring

Discrete output wiring depends on whether you will use internal or external power. The following diagrams are examples of proper wiring for these configurations:

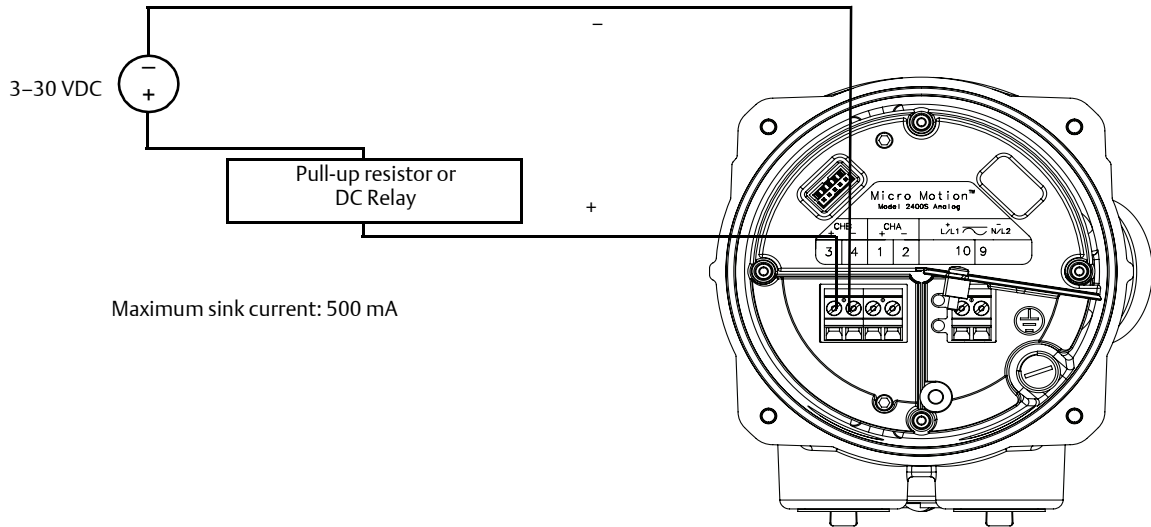
- Internal power – [Figure 3-9](#)
- External power – [Figure 3-10](#)

Figure 3-9 Discrete output wiring for internal power

**Note:**

See [Figure 3-11](#) for output voltage versus load information.

Figure 3-10 Discrete output wiring for external power



Note:

See [Figure 3-12](#) for recommended resistor versus supply voltage.

⚠ CAUTION!

Do not exceed 30 VDC input. Terminal current must be less than 500 mA. Excessive current will damage the transmitter.

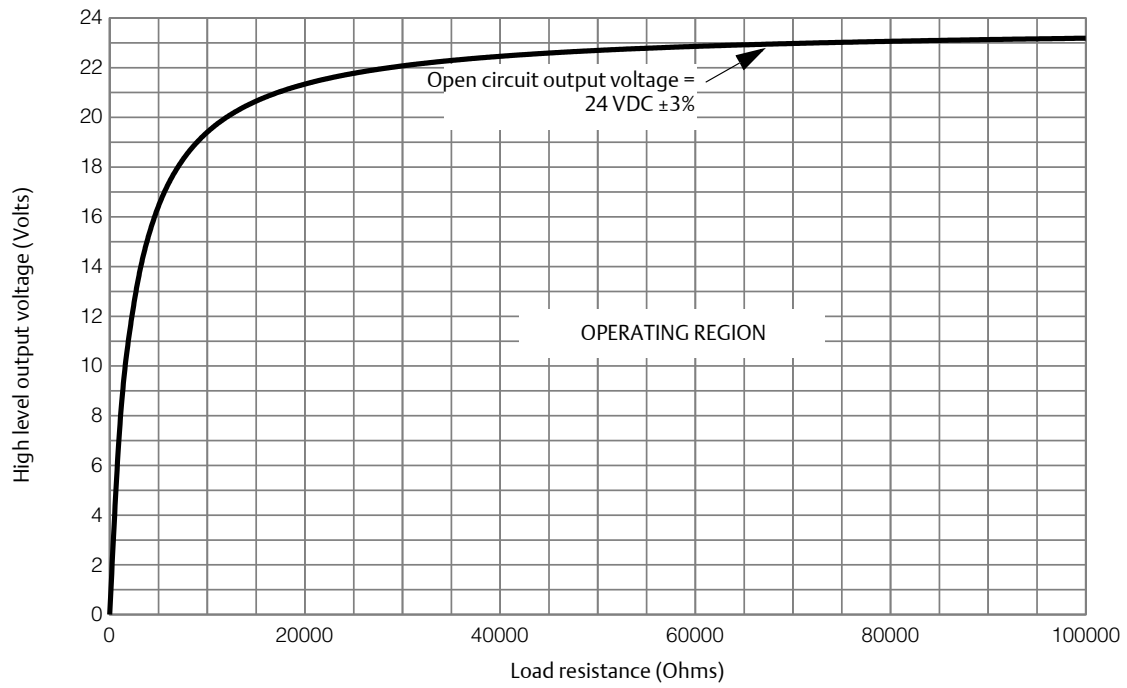
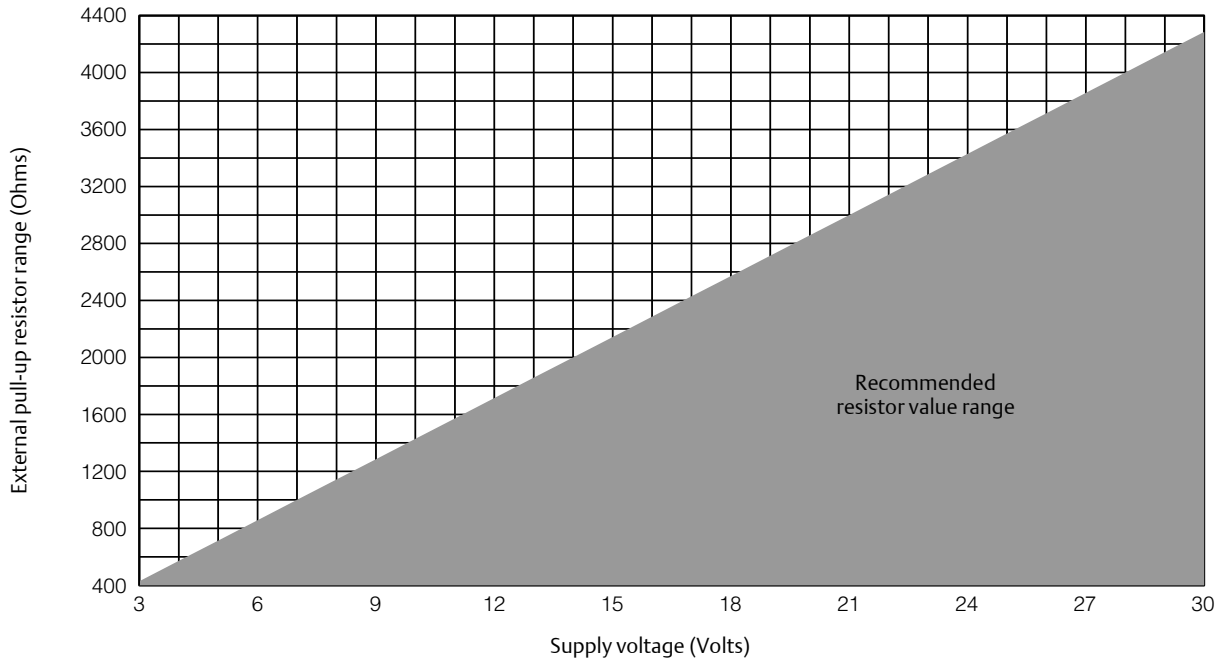
Figure 3-11 Output voltage vs load resistance for internal power

Figure 3-12 Recommended pull-up resistor versus supply voltage for external power**Note:**

When using a discrete output to drive a relay, choose external pull-up to limit current to less than 500 mA.

3.3.4 Discrete input wiring

Discrete input wiring depends on whether you will use internal or external power. The following diagrams are examples of proper wiring for these configurations:

- Internal power – [Figure 3-13](#)
- External power – [Figure 3-14](#)

If external power is configured, power may be supplied by a PLC or other device, or by direct DC input. See [Table 3-2](#).

Table 3-2 Input voltage ranges for external power

VDC	Range
3–30	High level
0–0.8	Low level
0.8–3	Undefined

Figure 3-13 Discrete input wiring for internal power

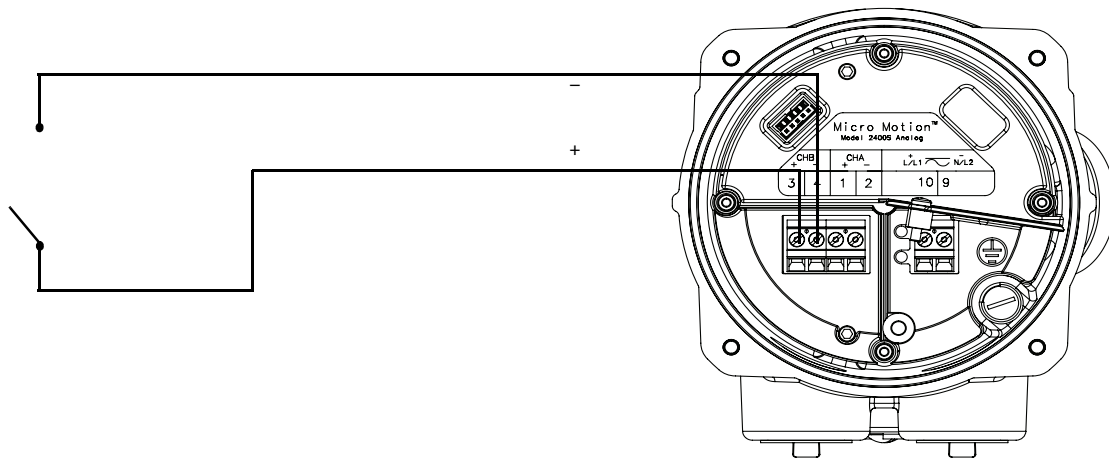
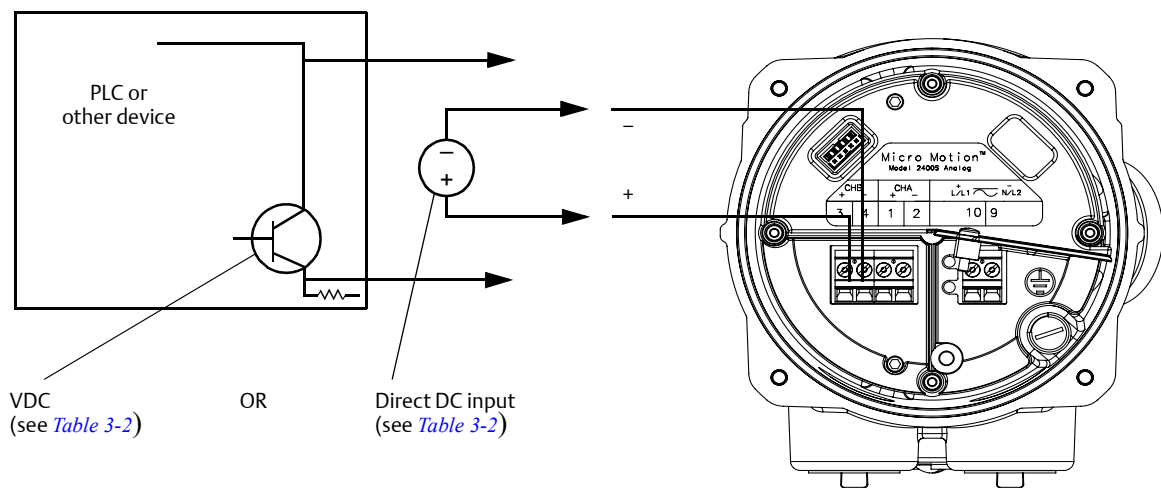


Figure 3-14 Discrete input wiring for external power



4 I/O wiring for Model 2400S PROFIBUS-DP and DeviceNet transmitters

This section describes how to wire I/O for Model 2400S PROFIBUS-DP and DeviceNet transmitters.

Note:

To wire I/O for Model 2400S Analog transmitters, see [Chapter 3](#).

Important:

Follow all corporate, local, and national safety requirements and electrical codes.

4.1 Moisture protection

When rotating or wiring the transmitter, guard against condensation or excessive moisture inside the transmitter housing. Be sure that the conduit openings are completely sealed after completing all installation and wiring procedures.

⚠ CAUTION!

Improperly sealed housings can expose electronics to moisture, which can cause measurement error or flowmeter failure. Install the meter so that the conduit openings do not point upward, and install drip legs in conduit or cable. Inspect and grease all gaskets and O-rings. Fully close and tighten all housing covers and conduit openings.

4.2 I/O wiring for Model 2400S PROFIBUS-DP transmitters

⚠ WARNING!

Follow all corporate, national, and local safety regulations.

To connect the I/O wiring for a 2400S PROFIBUS-DP transmitter:

1. Remove the user interface cover and user interface module.
For instructions, see [Section 2.2](#).
2. Wire the transmitter to the PROFIBUS-DP segment according to the diagram in [Figure 4-1](#).
3. Replace the user interface module and user interface cover.

Note:

Do not open the power compartment unless you are also wiring the power supply.

Note:

Ground the PROFIBUS cable shield at both ends. At the 2400S, ground the cable shield in an appropriate cable gland. If using an optional PROFIBUS-DP Eurofast M12 connector, ground the cable shield using the threads of the connector.

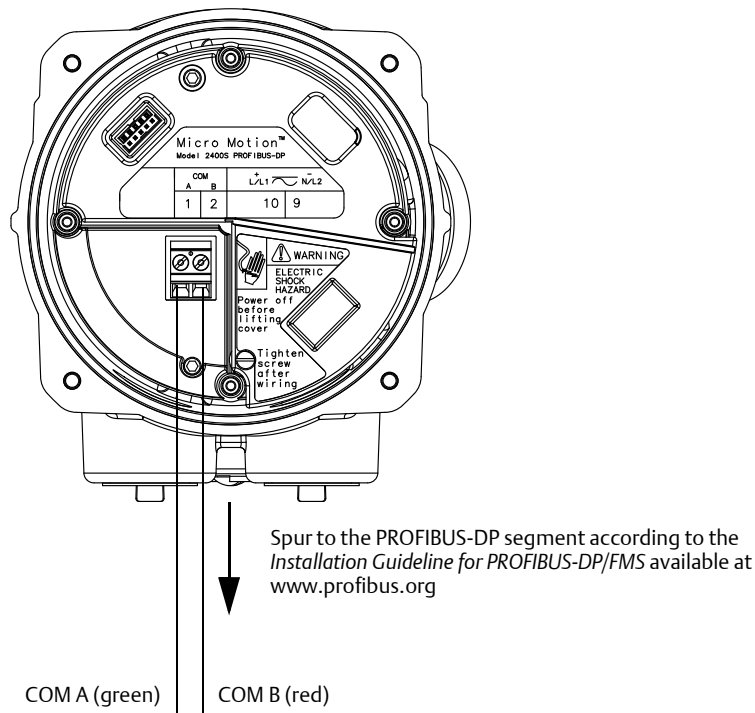
⚠ WARNING!

Hazardous voltage can cause severe injury or death. Keep the power supply compartment closed while wiring the transmitter outputs, or shut off power to the transmitter.

⚠ WARNING!

Make sure the transmitter is wired to meet or exceed local code requirements. Install the transmitter in an environment that complies with the classification tag on the transmitter. A transmitter that has been improperly wired or installed in a hazardous area could cause an explosion.

Figure 4-1 Model 2400S PROFIBUS-DP I/O wiring



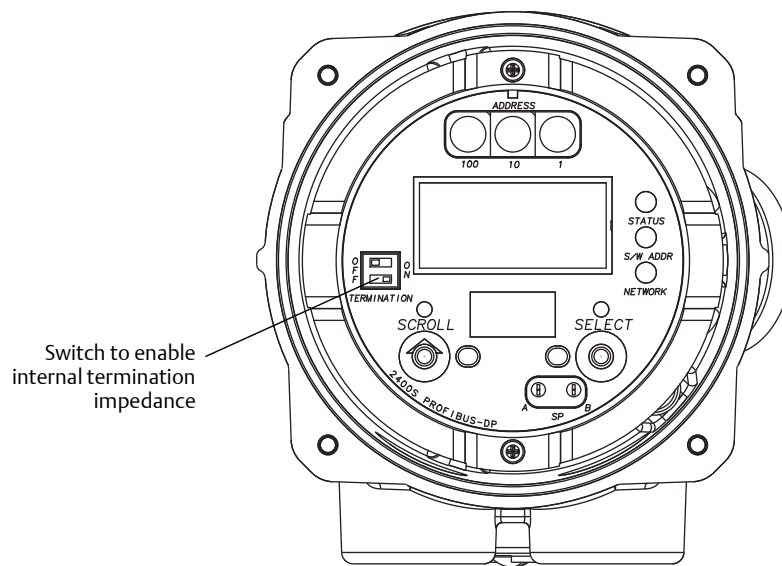
Note:

The Model 2400S PROFIBUS-DP transmitter does not have terminals for termination wiring. An external terminator is not required. The transmitter has an internal terminator. There is a switch on the user interface for enabling internal termination. See [Section 4.2.1](#).

4.2.1 Enable internal termination

Model 2400S PROFIBUS-DP transmitters have a switch on the user interface module to enable internal termination impedance. See [Figure 4-2](#).

Figure 4-2 Model 2400S PROFIBUS-DP internal termination impedance switch



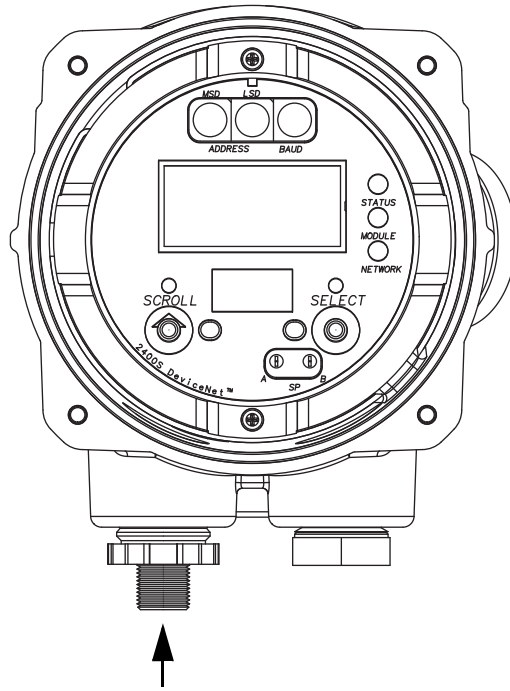
4.3 I/O wiring for Model 2400S DeviceNet transmitters

⚠ WARNING!

Follow all corporate, national, and local safety regulations.

1. Connect the transmitter to the DeviceNet segment according to the diagram in [Figure 4-3](#).
The transmitter is shipped with a DeviceNet male sealed Micro Connector (Eurofast) that has been preinstalled and wired according to the DeviceNet specification.

Figure 4-3 Model 2400S DeviceNet I/O wiring



Attach a 5-pin female Eurofast connector here

Appendix A

Dimensions and specifications

A.1 Dimensions

Figure A-1 and *Figure A-2* show the dimensions of the Model 2400S transmitter. For sensor dimensions, see the sensor data sheet.

Figure A-1 Transmitter housing dimensions for painted aluminum housing

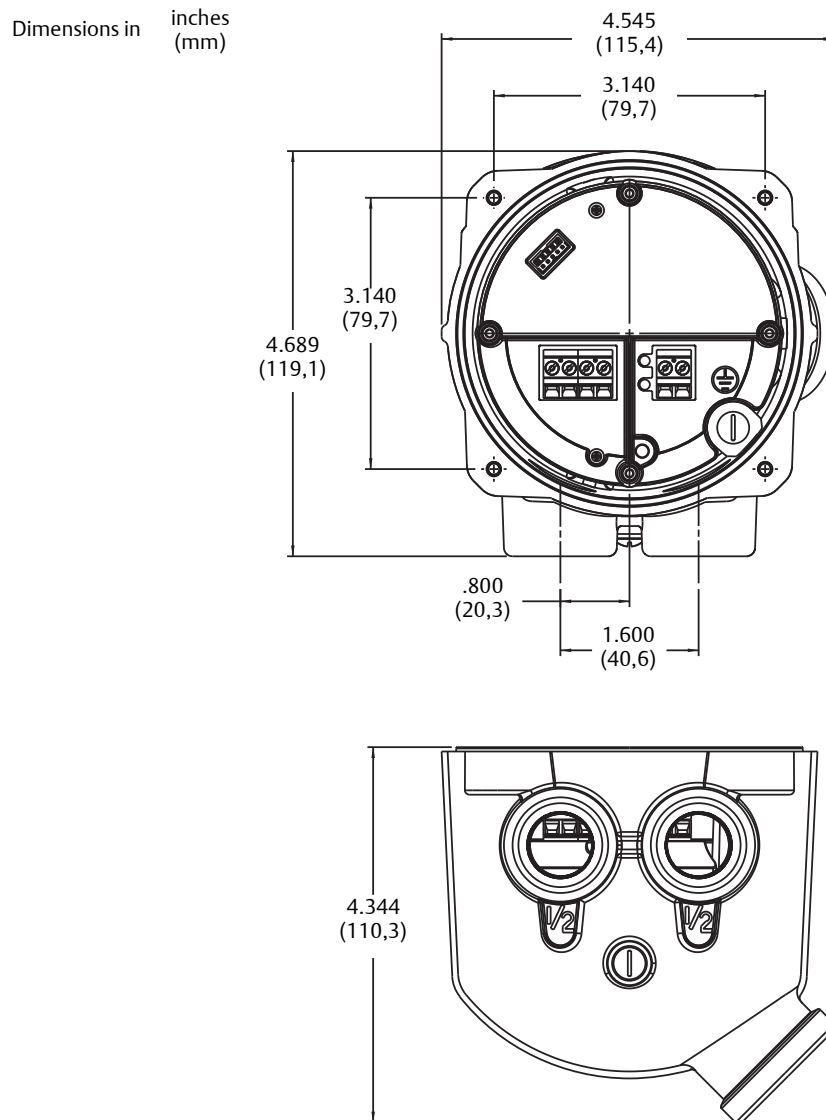
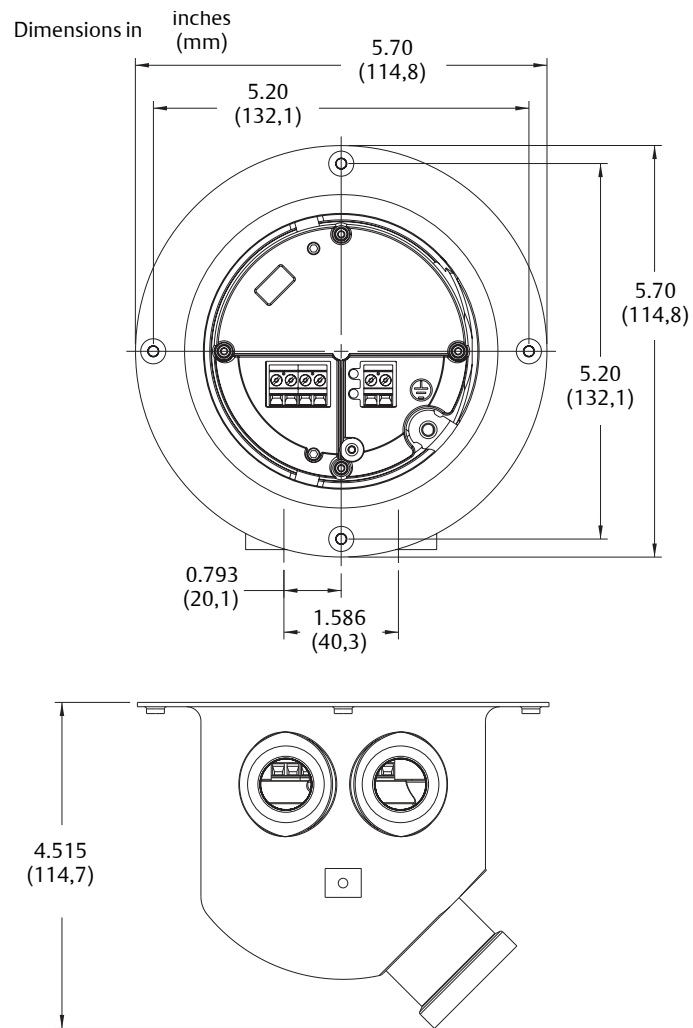
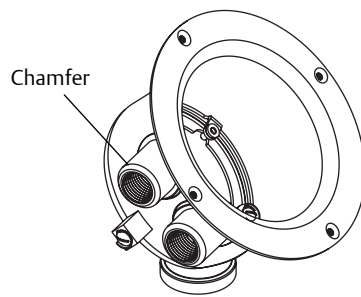


Figure A-2 Transmitter housing dimensions for stainless steel housing**Note:**

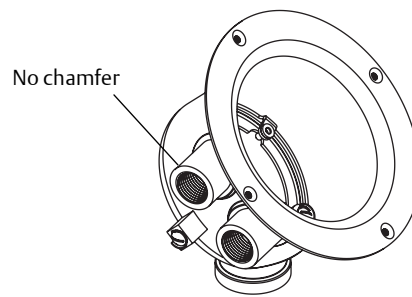
Torque the cover screws to a minimum of 19 in-lbs (2,1 N-m).

A.2 Physical specifications

Housing	Polyurethane-painted aluminum Optional: 316L stainless steel
Weight	Transmitter is mounted integrally with sensor. For weight of flowmeter, 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. Cable entry holes are available with 1/2–NPT and M20 options (refer to the 2400S Product Data Sheet for ordering codes).



1/2–NPT threads



M20 threads

A.3 Power supply for Models 2400S Analog and PROFIBUS-DP

- Self-switching AC/DC input automatically recognizes supply voltage.
- Complies with low voltage directive 2006/95/EC per EN 61010-1 (IEC 61010-1) with amendment 2.
- Installation (Overvoltage) Category II, Pollution Degree 2

AC	<ul style="list-style-type: none"> ■ 85-265 VAC ■ 50/60 Hz ■ 4 watts typical, 7 watts maximum
DC	<ul style="list-style-type: none"> ■ 18–100 VDC ■ 4 watts typical, 7 watts maximum
Fuse	800mA slow blow, IEC60127-3

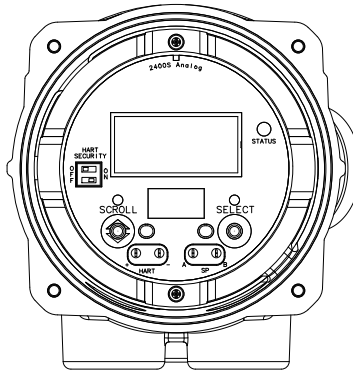
A.4 Electrical connections

Model 2400S Analog	
Input and output connections	Two pairs of wiring terminals for transmitter inputs/ outputs. Screw terminals accept solid or stranded conductors, 26 to 14 AWG (0,14 to 2,5 mm ²).
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, 26 to 14 AWG (0,14 to 2,5 mm ²).
Digital comm maintenance connections	Two clips for temporary connection to the service port. Two clips for temporary connection to HART/Bell 202 terminals
Model 2400S PROFIBUS-DP	
PROFIBUS-DP segment	One pair of wiring terminals for connection to PROFIBUS-DP segment. Connection type: <ul style="list-style-type: none"> ■ Screw terminals accept solid or stranded conductors, 26 to 14 AWG (0,14 to 2,5 mm²). ■ Five-pin PROFIBUS-DP M12 (Eurofast) female connector (optional).
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, 26 to 14 AWG (0,14 to 2,5 mm ²).
Digital comm maintenance connections	Two clips for temporary connection to the service port.
Model 2400S DeviceNet	
DeviceNet segment	One pre-installed male 5-pin Eurofast connector for I/O and power supply wiring
Digital comm maintenance connections	Two clips for temporary connection to the service port.

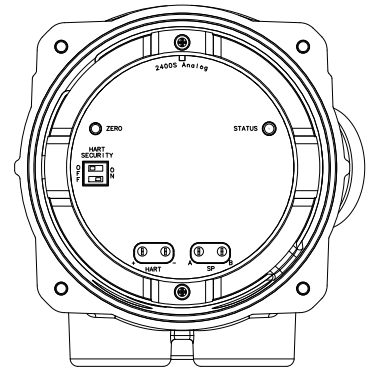
A.5 User interface

Model 2400S Analog

With display

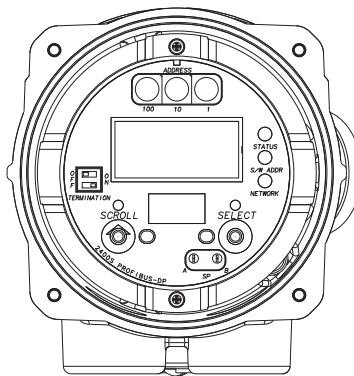


Without display

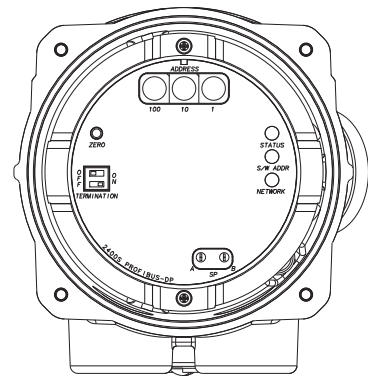


Model 2400S PROFIBUS-DP

With display

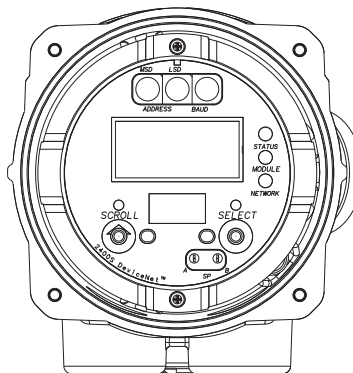


Without display

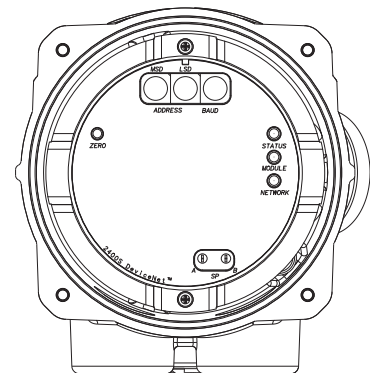


Model 2400S DeviceNet

With display



Without display



Interface functions	
All models with or without display	<ul style="list-style-type: none"> ■ Suitable for hazardous area installation. ■ User interface module can rotate 360° on the transmitter in 90° increments. ■ 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. ■ Two clips for service port connections (requires removing transmitter housing cover).
All models without display	<ul style="list-style-type: none"> ■ Transmitter housing cover is all metal (no lens). ■ Access to user interface requires removing transmitter housing cover. ■ Zero button allows flowmeter zero from field (requires removing transmitter housing cover). ■ No IrDA.
All models with display	<ul style="list-style-type: none"> ■ Depending on purchase option, transmitter housing cover has glass or plastic lens. ■ User interface module includes LCD panel. LCD line 1 displays process variable; line 2 displays engineering unit of measure. ■ Display update rate is user-configurable: 1 to 10 seconds at 1-second increments. ■ Display backlighting may be adjusted or turned off. ■ 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. ■ Infrared port allows access to service port from IrDA device (e.g., PDA running Pocket ProLink) without removing transmitter housing cover.
Model 2400S Analog with or without display	<ul style="list-style-type: none"> ■ Two clips for HART/Bell 202 connections (requires removing transmitter housing cover). ■ HART security switch (requires removing transmitter housing cover).
Model 2400S DeviceNet, with or without display	<ul style="list-style-type: none"> ■ Three rotary switches for selecting network address and baud rate (network address and baud rate are also software selectable). ■ Module and network LEDs to indicate DeviceNet status.
Model 2400S PROFIBUS-DP, with or without display	<ul style="list-style-type: none"> ■ Three rotary switches for selecting network address (network address is also software selectable). ■ DIP switch for enabling internal termination resistor. ■ Address and network LEDs that indicate PROFIBUS-DP status.

A.6 Input/output signals

A.6.1 Model 2400S Analog

Channel A

One active or passive 4–20 mA output

- Not intrinsically safe
- Isolated to ± 50 VDC from all other outputs and earth ground
- Maximum load limit: 820 ohms
- 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 10,000 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 12,500 Hz

One active or passive discrete output

- Not intrinsically safe
- Can report five discrete events, 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 reset all totals, reset mass total, reset volume total, start/stop totalizers, or start sensor zero

A.6.2 Model 2400S PROFIBUS-DP

- Digital 2-way PROFIBUS-DP signal.
- Certified by PNO.

A.6.3 Model 2400S DeviceNet

- Digital 2-way DeviceNet signal.
- Certified by ODVA.

A.7 Digital communications

All versions	
Service port	One service port for temporary connections (requires removing transmitter housing cover) Uses RS-485 Modbus signal, 38.4 kBaud, one stop bit, no parity Address: 111 (not configurable)
Wireless	If transmitter has display, service port can be accessed with IrDA device (for example, a PDA running Pocket ProLink) without removing transmitter housing cover.
Model 2400S Analog	
HART/Bell 202	HART signal is superimposed on the primary milliamp output, and is available for host system interface: <ul style="list-style-type: none"> ■ 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 Ω resistance
Model 2400S PROFIBUS-DP	
Digital 2-way communication protocol <ul style="list-style-type: none"> ■ Automatically recognizes network baud rate ■ Address selectable by 3 rotary switches, or software selectable 	
Model 2400S DeviceNet	
Digital 2-way communication protocol Address and baud rate selectable by 3 rotary switches (2 to select address, 1 to select baud rate), or software selectable.	

A.8 Host interface

Model 2400S Analog	ProLink [®] II v2.5 or later from Micro Motion supports full device configuration. HART DD file supports all functionality
Model 2400S PROFIBUS-DP	ProLink II v2.5 or later from Micro Motion supports full device configuration. GSD file conforming to the PROFIBUS-DP specification: <ul style="list-style-type: none"> ■ Provides Profibus Class 1 Master functions ■ Enables reading and controlling all process data DD file conforming to Profibus EDDL specification: <ul style="list-style-type: none"> ■ Provides Profibus Class 2 Master functions ■ Enables device configuration ■ Supports Siemens Simatic PDM
Model 2400S DeviceNet	ProLink II v2.5 or later from Micro Motion supports full device configuration. EDS file conforming to the DeviceNet specification that enables device configuration

A.9 Environmental limits

Ambient temperature limits	Operating and storage: -40 to +140 °F (-40 to +60 °C) Below -4 °F (-20 °C), LCD responsiveness decreases and LCD may become difficult to read. Above 131 °F (55 °C), some darkening of the LCD panel might occur.
Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)
Vibration limits	Meets IEC 60068-2-6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g

A.10 Environmental effects

All models






EMI effects	Complies with EMC directive 2004/108/EC per EN 61326 industrial Conforms to NAMUR NE-21 (09.05.2012)
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Model 2400S Analog only

Ambient temperature effect	On mA output: ±0.005% of span per °C
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A.11 Hazardous area classifications

All models

CSA C-US		Class I Division 2 Groups A, B, C, D T4A Class II Division 2 Groups F and G T4A	
ATEX	Analog or PROFIBUS-DP DeviceNet	 	II 3G Ex nA nC IIC T5 Gc II 3D Ex tc IIIC T70°C Dc
IECEX	Analog or PROFIBUS-DP DeviceNet	 	Ex nA IIC T5 Gc Ex tc IIIC T70°C Dc Ex nA IIC T5 Gc Ex tc IIIC T70°C Dc

Appendix B

Return Policy

Follow Micro Motion procedures when returning equipment. These procedures ensure legal compliance with government transportation agencies and help provide a safe working environment for Micro Motion employees. Failure to follow Micro Motion procedures will result in your equipment being refused delivery.

Information on return procedures and forms is available on our web support system at www.micromotion.com, or by phoning the Micro Motion Customer Service department.

B.1 New and unused equipment

Only equipment that has not been removed from the original shipping package will be considered new and unused. New and unused equipment requires a completed Return Materials Authorization form.

B.2 Used equipment

All equipment that is not classified as new and unused is considered used. This equipment must be completely decontaminated and cleaned before being returned.

Used equipment must be accompanied by a completed Return Materials Authorization form and a Decontamination Statement for all process fluids that have been in contact with the equipment. If a Decontamination Statement cannot be completed (e.g., for food-grade process fluids), you must include a statement certifying decontamination and documenting all foreign substances that have come in contact with the equipment.



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