

# Micro Motion<sup>®</sup> 4200 2-Wire Transmitter



### 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 EU declaration of conformity for directives that apply to this product. The EU 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](http://www.emerson.com) 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](http://www.emerson.com).

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 configuration manual. Product data sheets and manuals are available from the Micro Motion web site at [www.emerson.com](http://www.emerson.com).

### 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. Micro Motion will not accept your returned equipment if you fail to follow Micro Motion procedures.

Return procedures and forms are available on our web support site at [www.emerson.com](http://www.emerson.com), or by phoning the Micro Motion Customer Service department.

### Emerson Flow customer service

Email:

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Argentina	+54 11 4837 7000	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	8008 77334	China	+86 21 2892 9000
		Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
		Russia/CIS	+7 495 981 9811	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 Planning

## 1.1 About this document

This manual provides information on planning, mounting, wiring, and initial setup of the transmitter. For information on full configuration, maintenance, troubleshooting, or service of the transmitter, see the configuration and use manual.

The information in this document assumes that users understand:

- Basic transmitter and sensor installation, configuration, and maintenance concepts and procedures
- All corporate, local government, and national government safety standards and requirements that guard against injuries and death

## 1.2 Related documentation

See the approval documentation shipped with the transmitter, or download the appropriate documentation from the Micro Motion web site ([www.emerson.com/flowmeasurement](http://www.emerson.com/flowmeasurement)):

- *Micro Motion 4200 2-Wire Transmitter: Configuration and Use Manual*
- *Micro Motion 4200 2-Wire Transmitter: Product Data Sheet*
- *Micro Motion 4200 2-Wire Transmitter: Safety Manual for Safety Instrumented Systems*
- *Micro Motion ProLink III User Manual*
- Sensor installation manual, which is shipped with the sensor
- FMEDA report for Coriolis Flowmeter with 4200 Transmitter, Prepared for Emerson by exida.com LLC

## 1.3 Meter components

A 4200 meter consists of the following components:

- A transmitter
- A sensor

## 1.4 Installation types

The 4200 transmitter was ordered and shipped for one of two installation types. The fifth character of the transmitter number indicates the installation type.

**Figure 1-1: Installation type indication for 4200 transmitters**

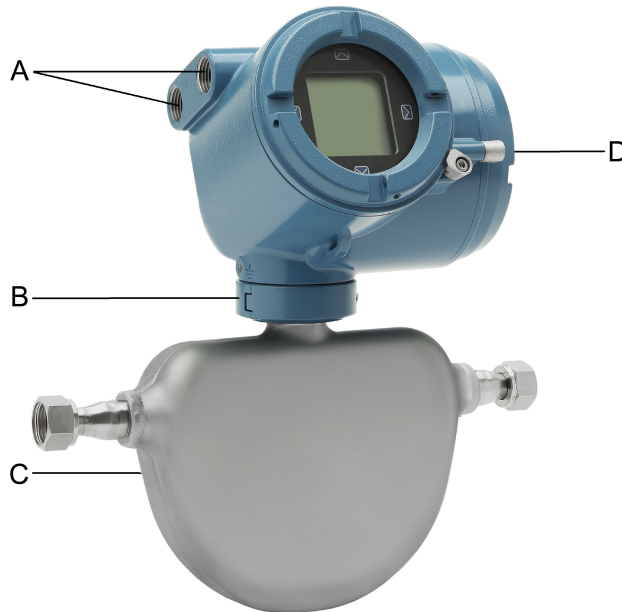
4200 I \*\*\*\*\*  
↑

The number is located on the device tag on the side of the transmitter.

**Table 1-1: Installation types for 4200 transmitters**

Code	Description
I	Integral mount
C	Remote mount

**Figure 1-2: 4200 transmitter -- Integral mount**



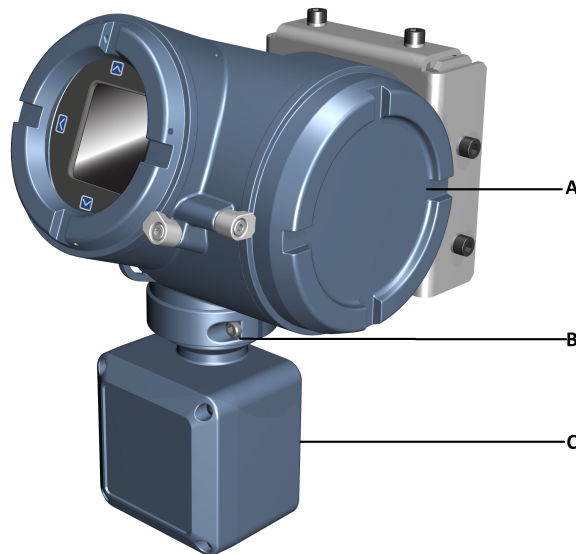
- A. Conduit openings
- B. Clamping ring
- C. Sensor case
- D. Transmitter housing cover (hidden from view)

The transmitter is installed directly on the sensor.

The connections between the transmitter and sensor are 9-wire, and do not require field wiring on the integral mount version.

The I/O connections consist of 2 channels, each channel being 2-wire. Power must be supplied to Channel A for the transmitter to operate, while Channel B connections are optional.

**Figure 1-3: 4200 transmitter -- Remote mount**



- A. Transmitter housing cover
- B. Clamping ring
- C. Junction box

The transmitter is installed remotely from the sensor. The 9-wire connection between the sensor and transmitter must be field wired. Power supply and I/O must be field wired to the transmitter. The sensor connection is in the junction box.

## 1.5 Installation checklist

- Safety messages are provided throughout this content to protect personnel and equipment. Read each safety message carefully before proceeding to the next step.
- When choosing a location for components, refer to the following guidelines:
  - See the sensor installation manual for information on locating the sensor with remote-mount or extended-mount electronics.

- Do not install a component in a location where its temperature, humidity, or vibration limits will be exceeded.
- Maximum distance between components depends on the wire size, the wire type, and the power supply. Ensure that sufficient power is supplied to the transmitter terminals.
- If you plan to mount the transmitter in a hazardous area:
  - Verify that the transmitter has the appropriate hazardous area approval. Each transmitter has a hazardous area approval tag attached to the transmitter housing.
  - Ensure that any cable used between the transmitter and the sensor meets the hazardous area requirements.
  - For ATEX/IECEx installations, you must strictly adhere to the safety instructions documented in the ATEX/IECEx approvals documentation available on the product documentation DVD shipped with the product or at [www.emerson.com/flowmeasurement](http://www.emerson.com/flowmeasurement).
- Verify that you have the appropriate cable and required cable installation parts for your installation. For wiring between the transmitter and sensor, verify the maximum cable length does not exceed 60 ft (20 m).
- The transmitter can be mounted in any orientation as long as the conduit openings do not point upward.

 **CAUTION**

Installing the transmitter with the conduit openings or transmitter display facing upward risks condensation moisture entering the transmitter housing, which could damage the transmitter.

- Minimize the amount of moisture or condensation inside the transmitter housing. Moisture inside the transmitter housing can damage the transmitter and cause measurement error or flowmeter failure. To do this:
  - Ensure the integrity of all gaskets and O-rings
  - Install drip legs on conduit or cable
  - Seal unused conduit openings
  - Ensure that all covers are fully tightened
- Mount the meter in a location and orientation that satisfies the following conditions:
  - Allows sufficient clearance to open the transmitter housing cover. Install with 8–10 inches (200–250 mm) clearance at the wiring access points.
  - Provides clear access for installing cabling to the transmitter.
  - Provides clear access to all wiring terminals for troubleshooting.



## 1.6 Maximum cable lengths between sensor and transmitter

The maximum cable length between the sensor and transmitter that are separately installed is determined by cable type.

Cable type	Wire gauge	Maximum length
Micro Motion 9-wire remote mount	Not applicable	60 ft (18 m)



## 2 Mounting and sensor wiring

### 2.1 Mounting and sensor wiring for integral-mount transmitters

There are no separate mounting requirements for integral transmitters, and no need to connect wiring between the transmitter and the sensor.

### 2.2 Mount the transmitter to a wall or instrument pole

There are two options available for mounting the transmitter:

- Mount the transmitter to a wall or flat surface.
- Mount the transmitter to an instrument pole.

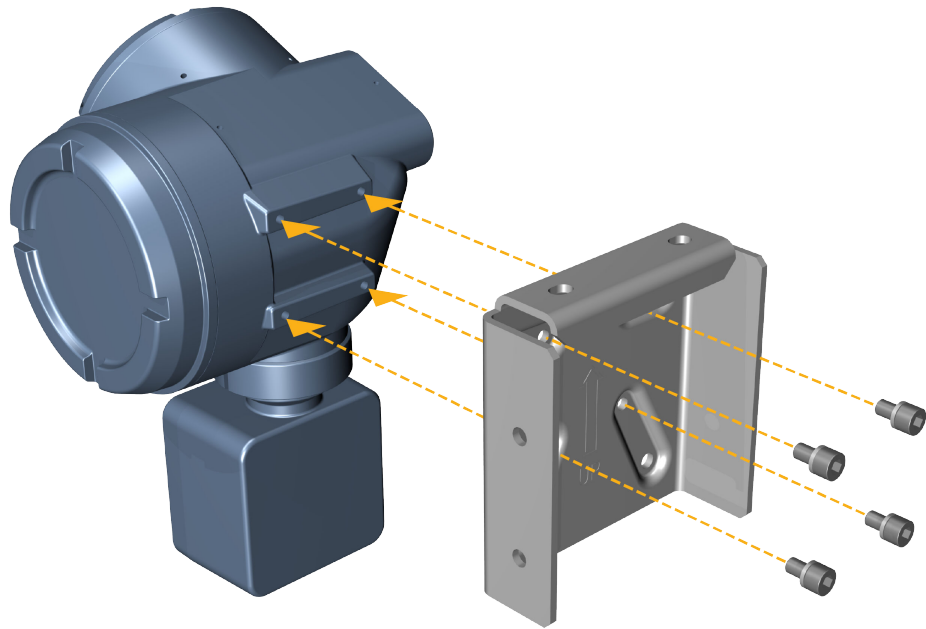
#### Prerequisites

- If you are mounting the transmitter to a wall or flat surface:
  - Ensure that the surface is flat and rigid, does not vibrate, or move excessively.
  - Confirm that you have the necessary tools, and the mounting kit shipped with the transmitter.
- If you are mounting the transmitter to an instrument pole:
  - Ensure that the instrument pole extends at least 12 in (305 mm) from a rigid base, and is no more than 2 in (51 mm) in diameter.
  - Confirm that you have the necessary tools, and the instrument-pole mounting kit shipped with the transmitter.

#### Procedure

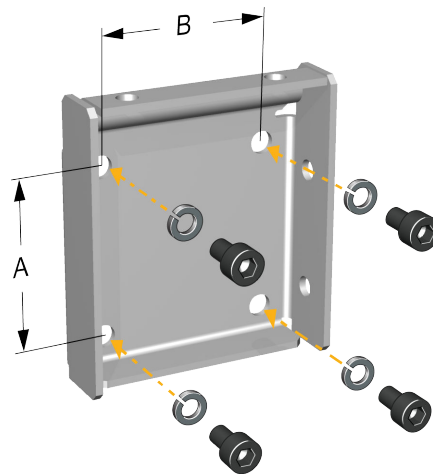
1. Attach the mounting bracket to the transmitter and tighten the screws.

**Figure 2-1: Mounting bracket to transmitter**



2. Using a wall-mount or pole-mount:
  - For wall-mount installations, secure the mounting bracket to the prepared surface.

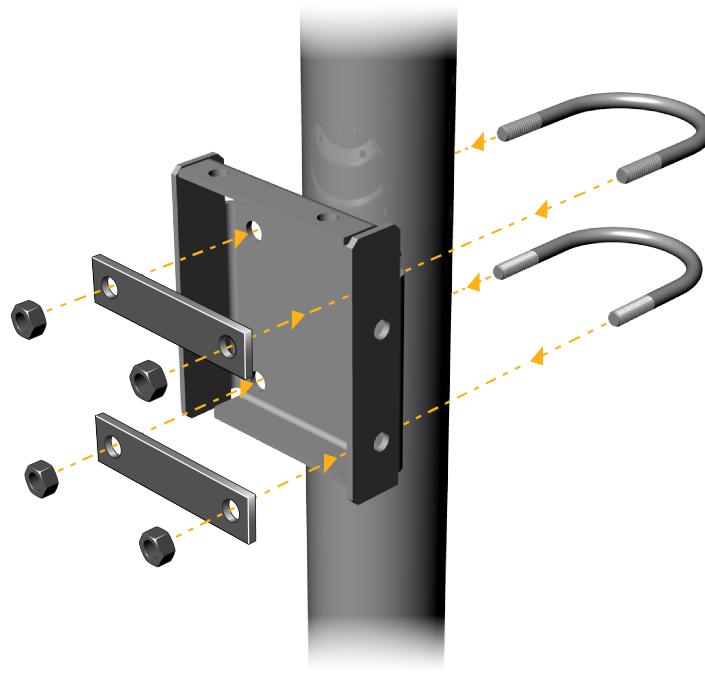
**Figure 2-2: Wall-mounting bracket dimensions**



- A. 2.8 in (71.4 mm)
- B. 2.8 in (71.4 mm)

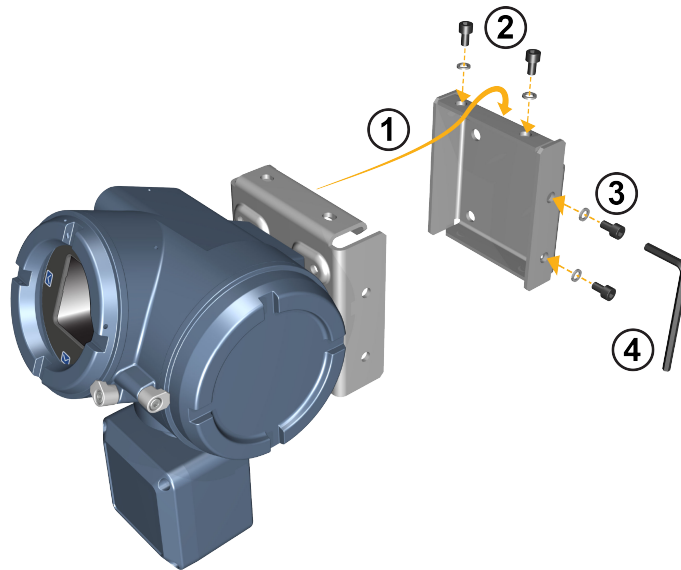
- For pole-mount installations, attach the U-bolt mounting piece to the instrument pole.

**Figure 2-3: Pole-mounting bracket attachment**



3. Place and attach the transmitter-mounting bracket to the mounting bracket secured to the wall or instrument pole.

Figure 2-4: Attaching and securing transmitter to mounting bracket



**Tip**

To ensure the mounting bracket holes are aligned, insert all attachment bolts into place before tightening.

## 2.3 Wire the 9-wire remote-mount transmitter to the sensor

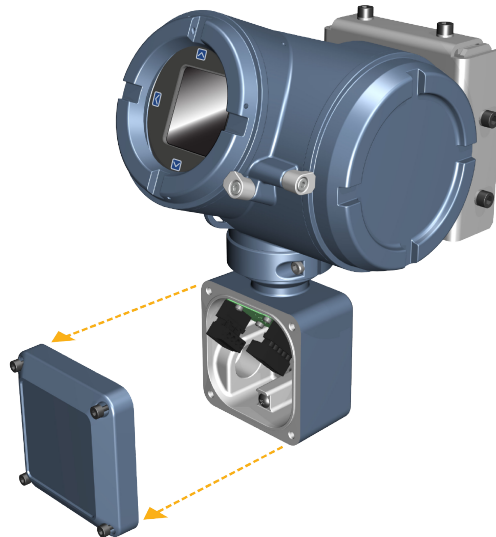
### Prerequisites

- Prepare 9-wire cable as described in the sensor documentation.
- Connect the cable to the sensor-mounted junction box as described in the sensor documentation. You can access all product documentation on the documentation DVD shipped with the product or at [www.emerson.com/flowmeasurement](http://www.emerson.com/flowmeasurement).

### Procedure

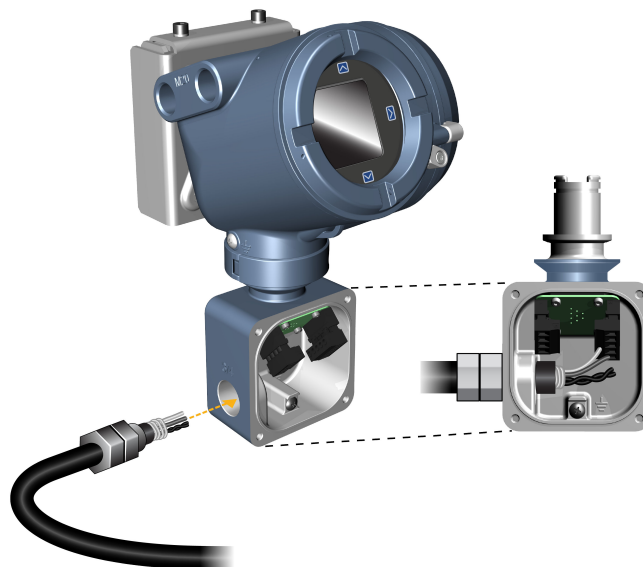
1. Remove the transmitter-to-sensor wiring compartment cover to reveal the terminal connections.

**Figure 2-5: Removal of the transmitter-to-sensor wiring compartment cover**



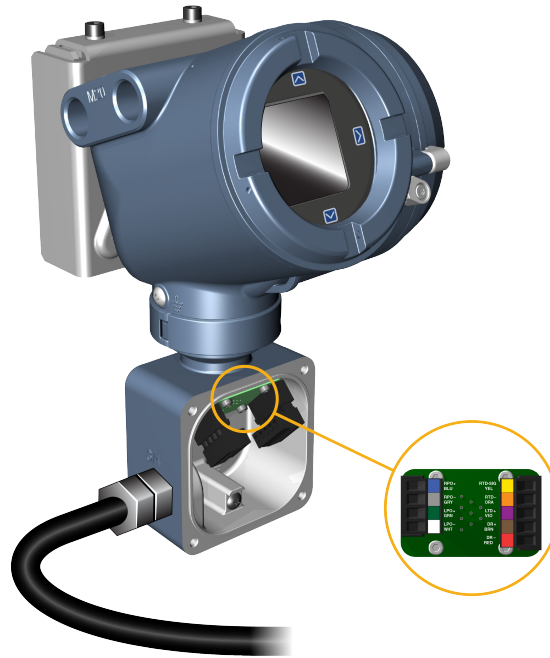
2. Feed the sensor wiring cable into the transmitter wiring compartment.

**Figure 2-6: Sensor wiring feedthrough**



3. Connect the sensor wires to the appropriate terminals:

Figure 2-7: 9-wire transmitter-to-sensor wiring connections



**Note**

Connect the 4 drain wires in the 9-wire cable to the ground screw located inside the junction box.

4. Replace the transmitter-to-sensor wiring compartment cover and tighten the screws to 14-16 in-lbs.

## 2.4 Ground the meter components

In 9-wire remote installations, the transmitter and sensor are grounded separately.

**Prerequisites**



**CAUTION**

Improper grounding could cause inaccurate measurements or meter failure.



**DANGER**

Failure to comply with requirements for intrinsic safety in a hazardous area could result in an explosion.

**Note**

For hazardous area installations in Europe, refer to standard EN 60079-14 or national standards.

If national standards are not in effect, adhere to the following guidelines for grounding:

- Use copper wire, 14 AWG (2.08 mm<sup>2</sup>) or larger wire size.



- Keep all ground leads as short as possible, less than 1  $\Omega$  impedance.
- Connect ground leads directly to earth, or follow plant standards.

#### Procedure

1. Ground the sensor according to the instructions in the sensor documentation.
2. Ground the transmitter according to applicable local standards, using the transmitter's internal or external ground screw.
  - The earth ground terminal is located inside the power wiring compartment.
  - The external ground screw is located on the side of the transmitter located below the transmitter tag.

## 2.5 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.

**Figure 2-8: Rotating the transmitter on the sensor**



A. Clamping ring

#### Procedure

1. Remove the metal clamping ring from the base of the feed through (refer to [Figure 2-8](#)).

2. Gently lift the transmitter on the feed through until it disengages from the notches on the feed through. You will not be able to remove the transmitter completely.
3. Rotate the transmitter to the desired position.

**⚠ CAUTION**

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

4. Lower the transmitter, sliding it onto the notches on the feed through.
5. Replace the clamping ring on the feed through. Tighten the screw to 28 in lbf (3.16 N m)– 32 in lbf (3.62 N m).

**⚠ CAUTION**

Ensure that the connection between the transmitter and the sensor is moisture-proof. Inspect and grease all gaskets and O-rings. Moisture in the electronics can cause measurement error or flowmeter failure.

## 2.6 Rotating the display orientation

The user interface orientation for the 4200 transmitter can rotate 360° in 90° increments by software selection.

Using the display, select **Menu > Configuration > Display Settings > Rotation**.



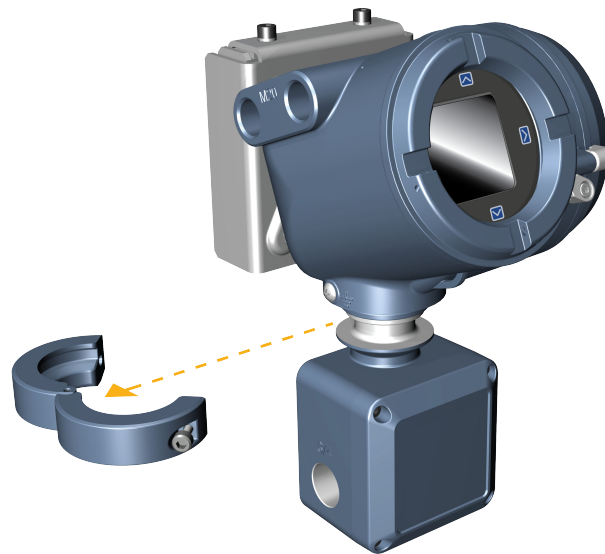
## 2.7 Rotate the sensor wiring junction box on a remote-mount transmitter (optional)

In remote-mount installations, you can rotate the sensor wiring junction box on the transmitter up to plus or minus 180 degrees.

### Procedure

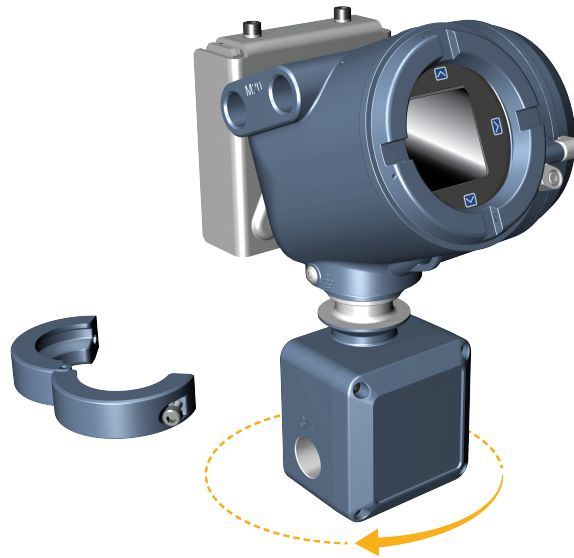
1. Using a 4 mm hex key, loosen and remove the clamp securing the sensor wiring junction box in place.

**Figure 2-9: Removal of the clamp**



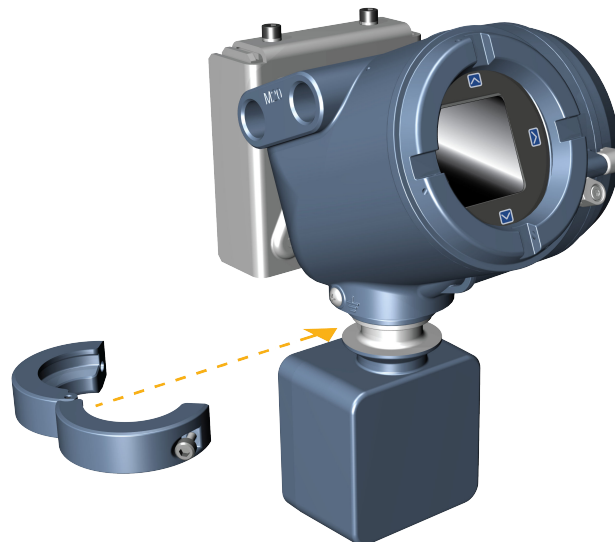
2. Gently rotate the junction box to the desired position.  
You can rotate the junction box plus or minus 180° to any position.

**Figure 2-10: Rotation of the sensor wiring junction box**



3. Gently set the junction box into its new position, confirming that the position is locked.
4. Replace the clamp in its original position and tighten the cap screw. Tighten the screw to 28 in lbf (3.16 N m)– 32 in lbf (3.62 N m).

**Figure 2-11: Re-attachment of the clamp**



## 3 Wiring the channels

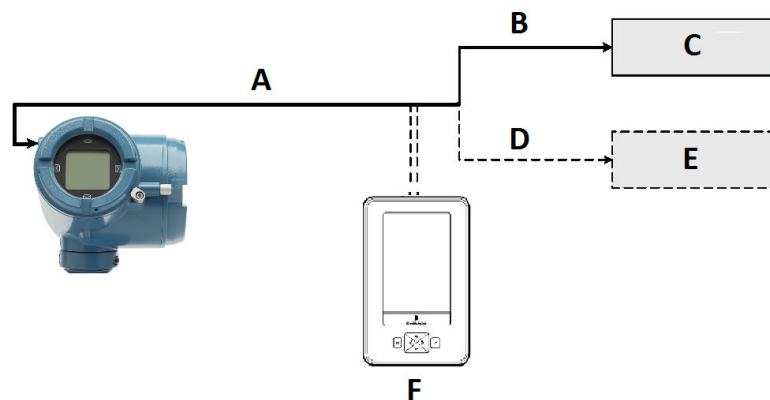
### 3.1 Installation types for the 4200 transmitter

**!** DANGER

If you are installing the transmitter in a hazardous area, refer to Micro Motion approval instructions, shipped with the product or available from the Micro Motion web site ([www.emerson.com/flowmeasurement](http://www.emerson.com/flowmeasurement)). Improper installation in a hazardous area can cause an explosion.

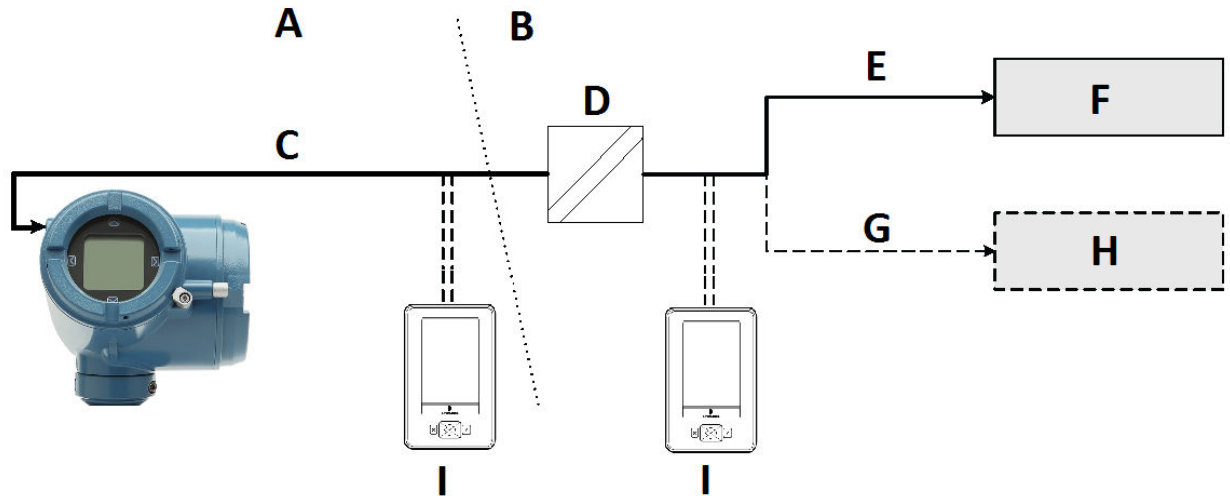
#### General configuration example

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- A. 2-wire cable power and signal
  - B. 4-20 mA
  - C. mA receiving device
  - D. HART variables
  - E. DCS
  - F. Emerson AMS Trex communicator
-

Connection example for cases where a barrier is required



- A. Hazardous area
- B. Safe area
- C. 2-wire cable power and signal
- D. Barrier
- E. 4-20 mA
- F. mA receiving device
- G. HART variables
- H. DCS
- I. Emerson AMS Trex communicator

## 3.2 Available channels

Signal	Channel A		Channel B	
Wiring terminals	1	2	3	4
mA outputs	4-20mA Loop Powered (HART)		(Optional licensed channel) Configurable as passive 4-20mA / Frequency Output / Discrete Output	

### 3.3 Barriers verified by Micro Motion

The following table lists the barriers that Micro Motion has verified with the 4200 transmitter. For other barriers, refer to the manufacturer's data sheet.

**Table 3-1: Barriers verified by Micro Motion**

Vendor	Barrier
Micro Motion	505
Pepperl & Fuchs	KFD2-STC1-EX1
Pepperl & Fuchs	KFD2-STC4-EX1
MTL	787S+
MTL	7707P+
MTL	7787+
MTL	5042
MTL	3046B
MTL	7728P+
MTL	4541
STAHL	9002/13-280-110-00
PR Electronics	5106

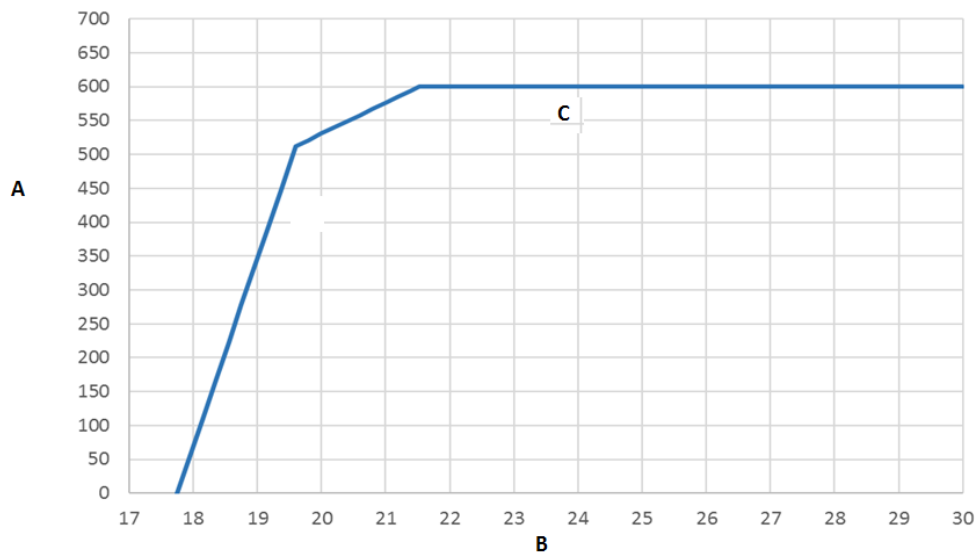
## 3.4 Channel power requirements

The supply voltage required by the 4200 transmitter depends on the total resistance in the mA loop. This includes all sense resistance and wire resistance.

### Channel A mA HART terminal requirements

Use the chart below to determine the required supply voltage for Channel A based on loop resistance.

**Figure 3-1: Channel A output supply voltage and loop resistance**



- A. Loop resistance (Ohms)
- B. Supply voltage (Vs)
- C. Maximum Loop Resistance (Ohms)

**Table 3-2: For maximum loop resistance for Channel A**

Condition	Equation
$17.75V < V_s < 19.6V$	$(V_s - 17.75) / 3.6mA$
$19.6V < V_s < 21.5V$	$(V_s - 8.32V) / 22mA$
$21.5V < V_s < 30V$	600 ohms

#### Note

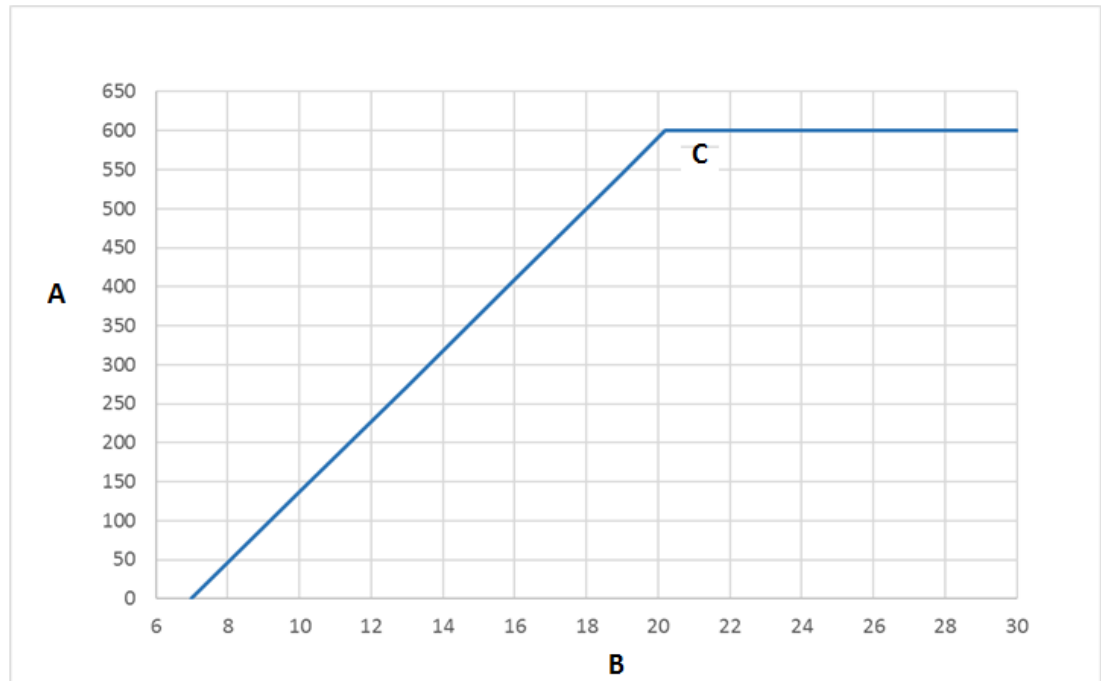
If display backlighting is enabled (refer to [Configure the display backlight](#)), the minimum input voltage required is 1V higher than the chart indicates.



### Channel B mA terminal requirements

Use the following chart to determine the required supply voltage for Channel B mA based on loop resistance.

**Figure 3-2: Channel B output supply voltage and loop resistance**



- A. Loop resistance (Ohms)
- B. Supply voltage (Vs)
- C. Maximum Loop Resistance (Ohms)

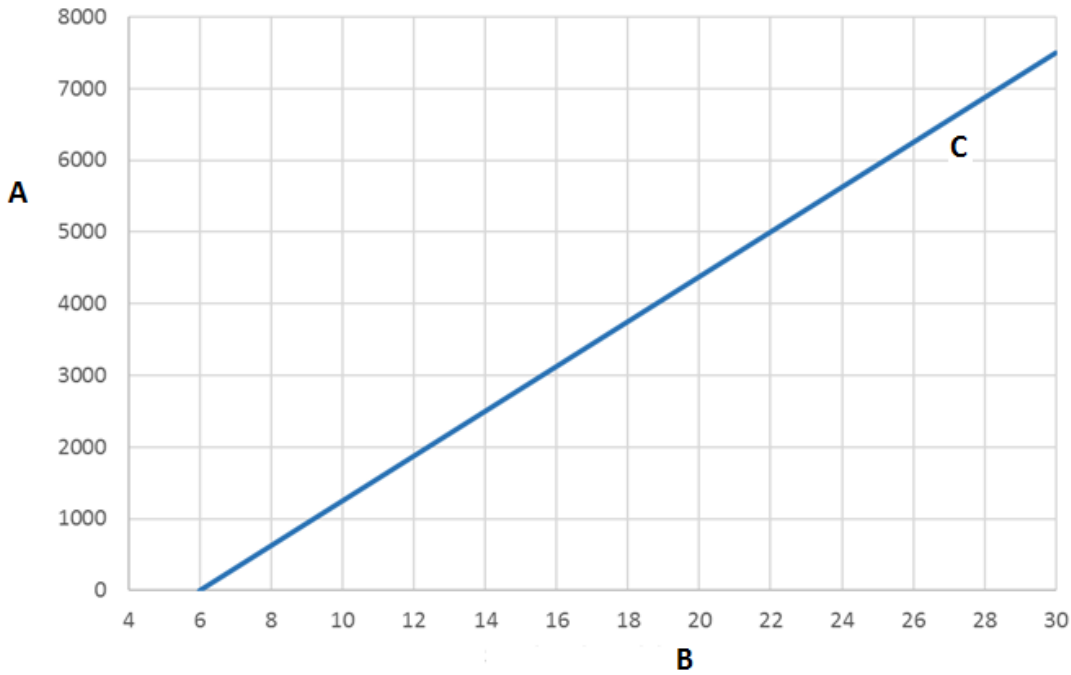
**Table 3-3: For maximum loop resistance for Channel B**

Condition	Equation
$7.0V < V_s < 20.2V$	$(V_s - 7.0V) / 22mA$
$20.2V < V_s < 30V$	600 ohms

### Channel B DO/FO terminal requirements

Use the chart below to determine the required supply voltage for Channel B for DO/FO.

**Figure 3-3: Channel B FO/DO output supply voltage and loop resistance**



- A. Loop resistance (Ohms)
- B. Supply voltage (Vs)
- C. Maximum Loop Resistance (Ohms)

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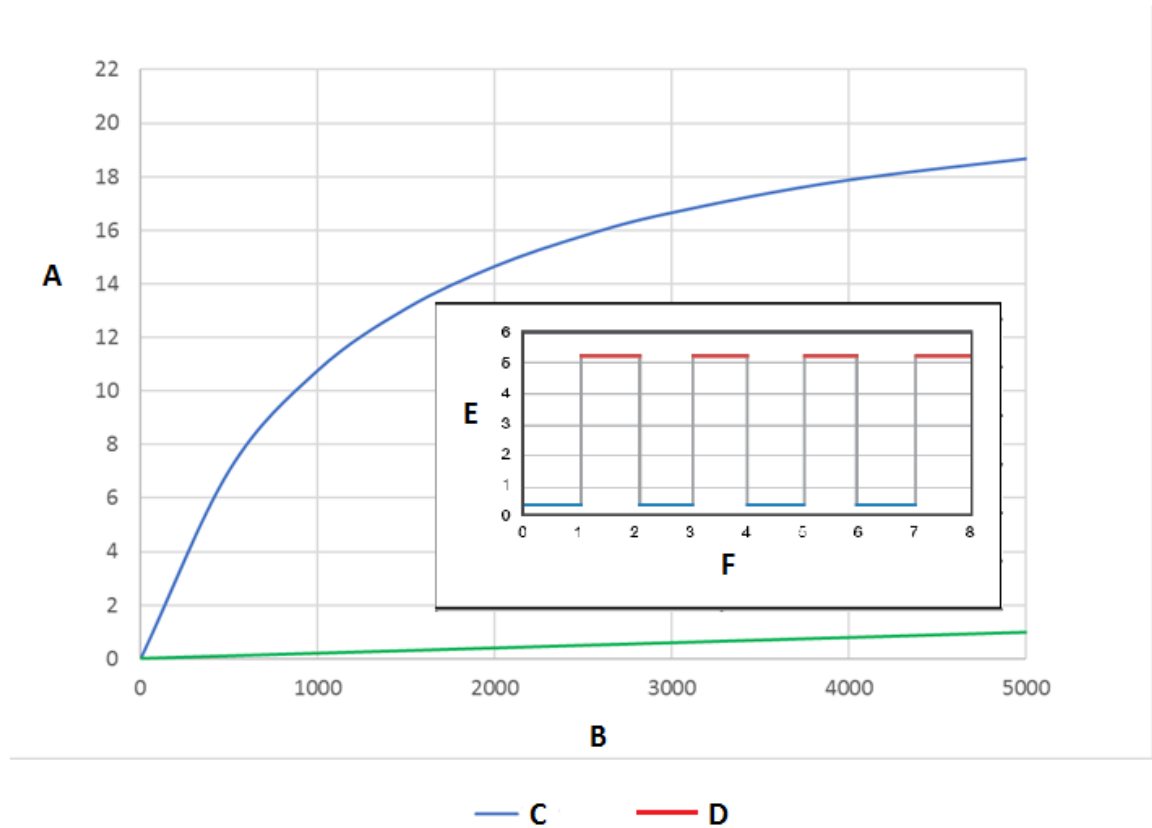
#### Note

For Maximum Loop Resistance:

- $(Vs - 6.0V) / 3.2mA$
-

**Channel B DO/FO high and low voltages for nonhazardous installations**

**Figure 3-4: Output high and low voltages**



- A. Output voltage (V)
- B. Load resistance (Ohm)
- C. Low voltage
- D. High voltage
- E. Voltage (volts)
- F. Time

**High and low voltage equations**

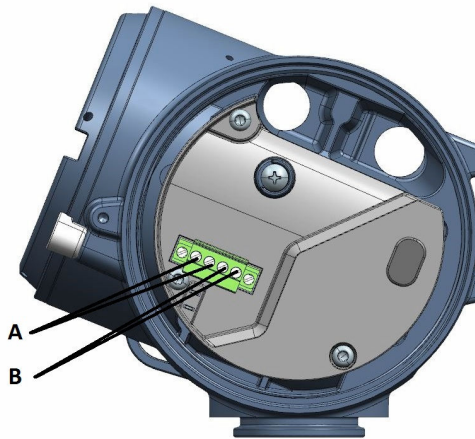
High voltage  $\approx (V_{\text{supply}} - 1.08V) * RL / (1130 + RL)$

Low voltage  $\approx 0.0002 * RL$

## 3.5 Access the wiring channels

### Procedure

1. Remove the wiring access cover to reveal the I/O wiring terminal block connectors.



- A. Channel A connections
- B. Channel B connections

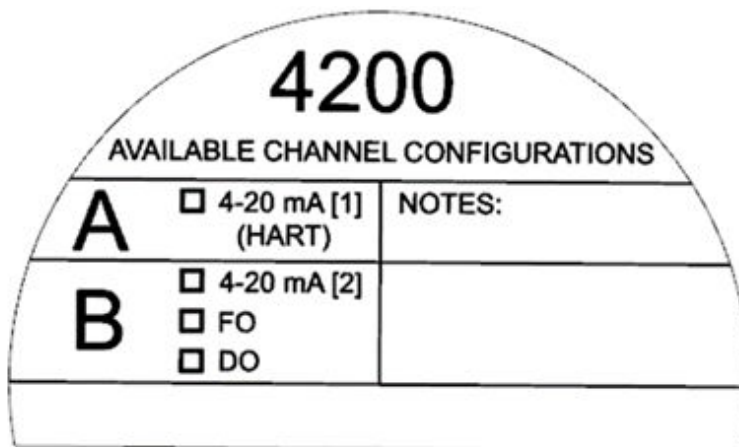
2. Confirm which transmitter channels are activated, or **ON**, and identify the type of configuration you will be wiring to based on the options available.

**Figure 3-5: Activated channel identification**

CH. A <input checked="" type="checkbox"/>		CH. B <input type="checkbox"/>	
+	-	+	-
1	2	3	4
CHANNEL <input checked="" type="checkbox"/> ON		<input type="checkbox"/> OFF	

3. (Recommended) Record the channel and wiring configuration on the label provided inside the transmitter housing cover.

Figure 3-6: Channel and wiring configurations label



## 3.6 Wire the Channel A mA HART output

To wire the mA/HART output in explosion-proof, intrinsically safe, or nonhazardous installations, follow this procedure.

### Important

Meter installation and wiring should be performed only by suitably-trained personnel using the appropriate government and corporate safety standards.

### Procedure

Wire to the appropriate output terminal and pins.

Figure 3-7: Channel A mA/HART output wiring (externally powered)



- A. mA HART output
- B. Supply Voltage (See Figure 3-1.)
- C. Loop Resistance (See Figure 3-1 for maximum loop resistance.)
- D. Input device

## 3.7 Wire the Channel B mA output

To wire the mA output in explosion-proof, intrinsically safe, or nonhazardous installations, follow this procedure.

### Important

Meter installation and wiring should be performed only by suitably-trained personnel using the appropriate government and corporate safety standards.

### Procedure

Wire to the appropriate output terminal and pins.

**Figure 3-8: Channel B mA output wiring (externally powered)**



- A. mA HART output
- B. Supply Voltage (See [Figure 3-2.](#))
- C. Loop Resistance (See [Figure 3-2](#) for maximum loop resistance.)
- D. Input device

## 3.8 Wire Frequency/Discrete output (Channel B)

Use this procedure to wire the externally-powered Frequency Output or Discrete Output for Channel B.

### Important

Meter installation and wiring should be performed only by suitably-trained personnel using the appropriate government and corporate safety standards.

### Procedure

Wire to the appropriate output terminal and pins.

**Figure 3-9: Discrete Output wiring (externally powered)**



- A. Frequency/ Discrete Output
- B. Channel B
- C. Supply Voltage (See [Figure 3-3.](#))
- D. Loop Resistance (See [Figure 3-3](#) for maximum loop resistance.)
- E. Counter or Discrete Output

## 3.9 Wire the mA/SIL output

Refer to the *Micro Motion 4200 2-Wire Transmitter: Safety Manual for Safety Instrumented Systems* for additional information regarding installation and commissioning that complies with SIS requirements.





## 4 Power up the transmitter

The transmitter must be powered up for all configuration and commissioning tasks, or for process measurement.

### Procedure

1. Ensure that all transmitter and sensor covers and seals are closed.



To prevent ignition of flammable or combustible atmospheres, ensure that all covers and seals are tightly closed. For hazardous area installations, applying power while housing covers are removed or loose can cause an explosion.

2. Turn on the electrical power at the power supply.  
The transmitter will automatically perform diagnostic routines. During this period, the Warming Up alert is active. The diagnostic routines should complete in approximately 30 seconds.

### Postrequisites

Although the sensor is ready to receive process fluid shortly after power-up, the electronics can take up to 10 minutes to reach thermal equilibrium. Therefore, if this is the initial startup, or if power has been off long enough to allow components to reach ambient temperature, allow the electronics to warm up for approximately 10 minutes before relying on process measurements. During this warm-up period, you may observe minor measurement instability or inaccuracy.



## 5 Configuring the transmitter with Guided Setup

At initial startup of the transmitter, click the right arrow for the **Menu** option to access Guided Setup. This tool guides you through basic configuration of the transmitter. The guided setup allows you to upload configuration files, set the transmitter display options, configure channels, and review sensor calibration data.

### **Procedure**

To access the guided setup screen from the display main menu, go to: **Startup Tasks > Guided Setup**.



## 6 Using the display controls

The transmitter display interface includes a display (LCD panel) and four capacitive buttons – left, up, down, and right arrow keys – used to access the display menus and navigate the display screens.

### Procedure

1. To activate a capacitive button, press the desired button that is designated with arrows (up, down, left, and right).

You can activate the capacitive button through the lens. Do not remove the transmitter housing cover.

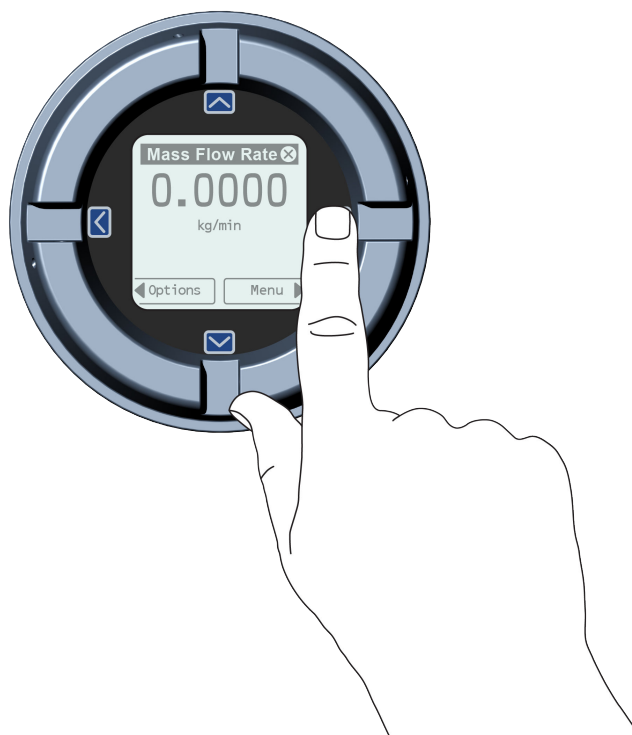
---

### Important

The transmitter only detects one button selection at a time. Be sure to press your thumb or finger on a single capacitive button.

---

**Figure 6-1: Proper finger positioning for activating a capacitive button**



2. Use the arrow indicators on the display screen to identify which capacitive button to use to navigate the screen (see examples 1 and 2).

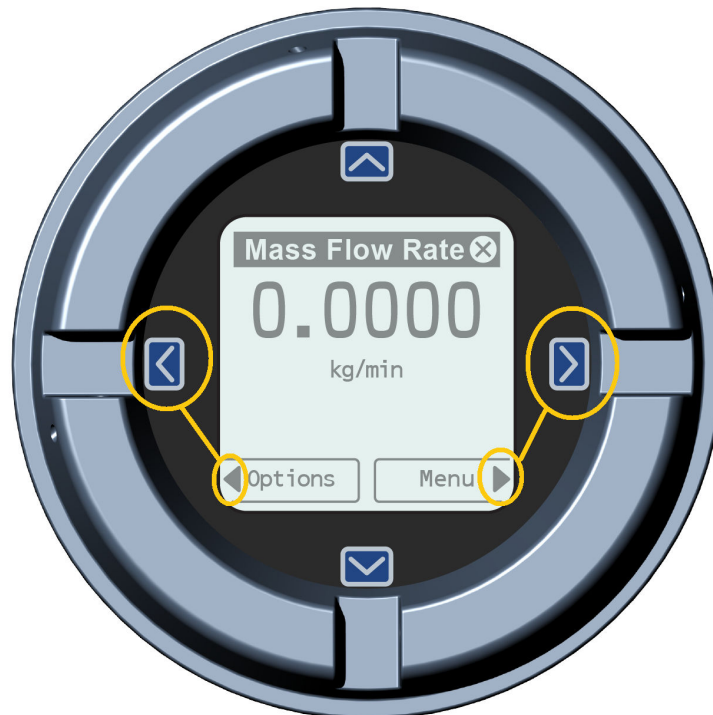
---

**Important**

When using the arrow keys, you must first activate the capacitive button, then release the same button by removing your finger from the glass to move up, down, right, left or to make a selection. To enable auto-scroll when navigating up or down, activate the appropriate button and continue to hold for one second. Release the button when the desired selection is highlighted.

---

**Figure 6-2: Example 2: Active arrow indicators on the transmitter display**



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## 6.1 Configure the display backlight

By default, the backlight is set to OFF. The backlight requires an additional 1V in voltage over no backlight.

**Procedure**

To enable the backlight, select **Menu > Configuration > Display Settings > Backlight**.

## 7 Communicating with the transmitter

Use either the HART terminals connected to ProLink III or a hand-held 475 or Trex unit to download or upload data from/to the transmitter, because the service port is for factory use only.

### Procedure

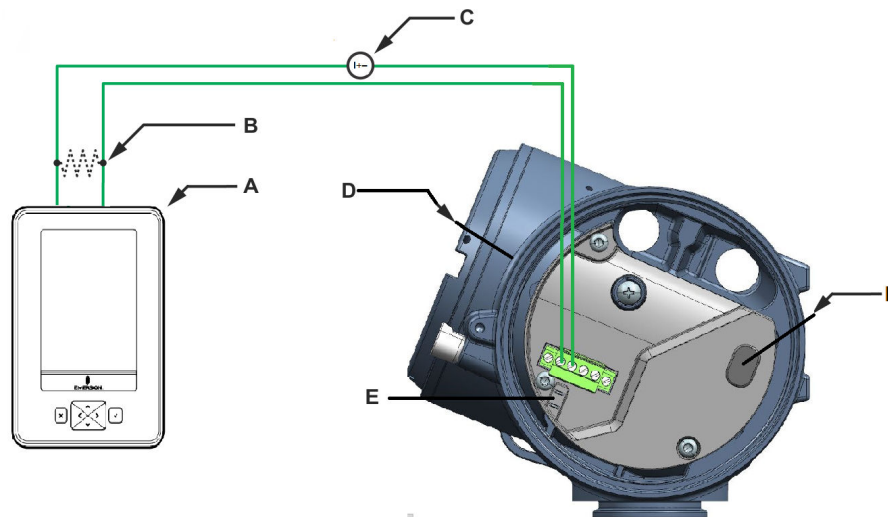
1. To connect to the transmitter terminals or to the HART connection posts:
  - a) Remove the transmitter end-cap.
  - b) Attach the leads from the Field Communicator to terminals 1 and 2 on the transmitter, or to the HART connection posts, and add resistance as required.

The Field Communicator must be connected across a resistance of 250–600  $\Omega$ .

### Tip

HART connections are not polarity-sensitive. It does not matter which lead you attach to which terminal.

**Figure 7-1: Field Communicator connection to transmitter terminals**



- A. Field Communicator
- B. 250–600  $\Omega$  resistance
- C. External power supply, if required
- D. Transmitter with end-cap removed
- E. HART connection posts
- F. Factory use only

2. Turn on the Field Communicator and wait until the main menu is displayed.



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