

# Micro Motion™ 5700 Transmitters

Installation Manual for PROFIBUS® -PA



### **Safety messages**

Safety messages are provided throughout this manual to protect personnel and equipment. Read each safety message carefully before proceeding to the next step.

### **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 following are available: the EU Declaration of Conformity, with all applicable European directives, and the complete ATEX installation drawings and instructions. In addition, the IECEx installation instructions for installations outside of the European Union and the CSA installation instructions for installations in North America are available at [Emerson.com](https://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 at [Emerson.com](https://www.emerson.com). For hazardous installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

### **Other information**

Troubleshooting information can be found in the [Configuration Manual](#). Product data sheets and manuals are available from the Micro Motion website at [Emerson.com](https://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. If you fail to follow Micro Motion procedures, then Micro Motion will not accept your returned equipment.

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

# Contents

<b>Chapter 1</b>	<b>Before you begin.....</b>	<b>5</b>
	1.1 About this document.....	5
	1.2 Hazard messages.....	5
	1.3 Related documentation.....	6
<b>Chapter 2</b>	<b>Planning.....</b>	<b>7</b>
	2.1 Installation checklist.....	7
	2.2 Additional considerations for retrofitting existing installations.....	8
	2.3 Power requirements.....	9
<b>Chapter 3</b>	<b>Mounting and sensor wiring.....</b>	<b>11</b>
	3.1 Mounting and sensor wiring for integral-mount transmitters.....	11
	3.2 Mounting transmitters.....	11
	3.3 Wire a remote-mount transmitter to the sensor.....	15
	3.4 Ground the meter components.....	18
	3.5 Rotate the transmitter on the sensor (optional).....	19
	3.6 Rotate the user interface on the transmitter (optional).....	21
	3.7 Rotate the sensor wiring junction box on a remote-mount transmitter (optional).....	22
<b>Chapter 4</b>	<b>Wiring the channels.....</b>	<b>25</b>
	4.1 Installation types for the 5700 transmitter.....	25
	4.2 Available channels.....	25
	4.3 Access the wiring channels.....	26
	4.4 I/O wiring.....	27
	4.5 FISCO-input entity parameters.....	29
	4.6 Wiring for nonhazardous installations.....	29
	4.7 Wiring for hazardous installations.....	32
<b>Chapter 5</b>	<b>Wiring the power supply.....</b>	<b>37</b>
<b>Chapter 6</b>	<b>Setting the 5700 for PROFIBUS-PA communication.....</b>	<b>39</b>
	6.1 Addressing.....	39
<b>Chapter 7</b>	<b>Power up the transmitter.....</b>	<b>41</b>
<b>Chapter 8</b>	<b>Guided setup.....</b>	<b>43</b>
<b>Chapter 9</b>	<b>Using the display controls.....</b>	<b>45</b>
<b>Chapter 10</b>	<b>Available service port connection.....</b>	<b>47</b>



# 1 Before you begin

## 1.1 About this document

This manual provides information on planning, mounting, wiring, and initial setup of the Micro Motion 5700 PROFIBUS-PA transmitter. For information on full configuration, maintenance, troubleshooting, or service of the transmitter, see the .

The information in this document assumes that users understand basic transmitter and sensor installation, configuration, and maintenance concepts and procedures.

## 1.2 Hazard messages

This document uses the following criteria for hazard messages based on ANSI standards Z535.6-2011 (R2017).

 **DANGER**

Serious injury or death will occur if a hazardous situation is not avoided.

 **WARNING**

Serious injury or death could occur if a hazardous situation is not avoided.

 **CAUTION**

Minor or moderate injury will or could occur if a hazardous situation is not avoided.

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**NOTICE**

Data loss, property damage, hardware damage, or software damage can occur if a situation is not avoided. There is no credible risk of physical injury.

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**Physical access**

 **WARNING**

Unauthorized personnel can potentially cause significant damage and/or misconfiguration of end users' equipment. Protect against all intentional or unintentional unauthorized use.

Physical security is an important part of any security program and fundamental to protecting your system. Restrict physical access to protect users' assets. This is true for all systems used within the facility.

## 1.3 Related documentation

You can find all product documentation on the product documentation DVD shipped with the product or at [Emerson.com](https://www.emerson.com).

See any of the following documents for more information:

- *Micro Motion 5700 Product Data Sheet*
- *Micro Motion 5700 Transmitters for PROFIBUS-PA: Configuration and Use Manual*
- *PROFIBUS-PA User and Installation Guideline*
- Sensor installation manual

## 2 Planning

### 2.1 Installation checklist

- If possible, install the transmitter in a location that will prevent direct exposure to sunlight. The environmental limits for the transmitter may be further restricted by hazardous area approvals.

- If you plan to mount the transmitter in a hazardous area:

**⚠ WARNING**

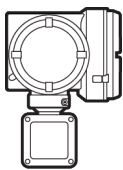
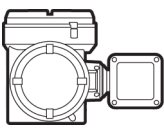
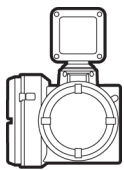
- Verify that the transmitter has the appropriate hazardous area approval. Each transmitter has a hazardous area approval tag attached to the transmitter housing.
- Ensure that any cable used between the transmitter and the sensor meets the hazardous area requirements.
- For ATEX/IECEX installations, 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 [Emerson.com](http://Emerson.com).

- 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 1,000 ft (305 m).

- Ensure that you use the following cables for the different connections:
  - A certified PROFIBUS-PA cable for PROFIBUS-PA terminals
  - A shielded, twisted-pair instrument cable with drain for all output connections

- You can mount the transmitter in any orientation as long as the conduit openings do not point upward.

Installing the transmitter with the conduit openings facing upward risks condensation moisture entering the transmitter housing, which could damage the transmitter. Following are examples of possible orientations for the transmitter.

Preferred orientation	Alternate orientations	
		

- Any fittings, adapters, or blanking elements used on either conduit entries or threaded joints that are a part of flame proof joints must comply with the requirements of EN/IEC 60079-1 & 60079-14 or CSA C22.2 No 30 & UL 1203 for Europe/International and North America respectively.

Only qualified personnel can select and install these elements in accordance with EN/IEC 60079-14 for ATEX/IECEX or to NEC/CEC for North America.

- To maintain the Ingress protection thread sealant, a sealing washer, or O-ring must be applied:
  - For Zone 1 applications thread sealant must also comply with the requirements of EN/IEC 60079-14 and thus must be non-setting, non-metallic, non-combustible, and maintain earthing between the equipment and conduit.
  - For Class I, Groups A, B, C, and D applications thread sealant must also comply with the requirements of UL 1203/CSA C22.2 No. 30.
- 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 in (203 mm) to 10 in (254 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.

## 2.2 Additional considerations for retrofitting existing installations

- The transmitter installation may require 3 in (76 mm) to 6 in (152 mm) of additional wiring for the input/output and power connections. This length would be in addition to the currently installed wiring. Confirm you have the additional wiring necessary for the new installation.
- Before removing the existing transmitter, be sure to record the configuration data for the currently installed transmitter. At initial startup of the newly installed transmitter, you will be prompted to configure the meter via a guided setup. Record the following information (if applicable):

Variable	Setting
Tag	
Mass flow units	
Volume flow units	
Density units	
Temperature units	
<b>Calibration parameters (for 9-wire installations only)</b>	
Flow calibration factor	FCF (Flow Cal or Flow Calibration Factor):



Variable	Setting
Density calibration factors	<ul style="list-style-type: none"> <li>— D1:</li> <li>— D2:</li> <li>— K1:</li> <li>— K2:</li> <li>— TC:</li> <li>— FD:</li> </ul>
<b>Function block settings</b>	
Channel assignment	
L_Type	
XD_scale (engineering units assignment)	
Device address	
Ident selection	

## 2.3 Power requirements

Self-switching AC/DC input, automatically recognizes supply voltage:

- 85 to 240 VAC, 50/60 Hz, 6 watts typical, 11 watts maximum
- 18 to 100 VDC, 6 watts typical, 11 watts maximum

### Note

For DC power:

- Power requirements assume a single transmitter per cable.
- At start-up, the power source must provide a minimum of 1.5 amps of short-term current per transmitter and not pull voltage below 18 VDC.
- 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 0.7 amps.

### Cable sizing formula

$$M = 18V + (R \times L \times 0.5A)$$

- M: minimum supply voltage
- R: cable resistance (in  $\Omega$ /ft)
- L: cable length (in ft)

### Typical power cable resistance at 68 °F (20.0 °C)

Wire gauge	Resistance
14 AWG	0.0050 $\Omega$ /ft
16 AWG	0.0080 $\Omega$ /ft

Wire gauge	Resistance
18 AWG	0.0128 Ω/ft
20 AWG	0.0204 Ω/ft
2.5 mm <sup>2</sup>	0.0136 Ω/m
1.5 mm <sup>2</sup>	0.0228 Ω/m
1.0 mm <sup>2</sup>	0.0340 Ω/m
0.75 mm <sup>2</sup>	0.0460 Ω/m
0.50 mm <sup>2</sup>	0.0680 Ω/m

### 2.3.1 Maximum cable lengths between sensor and transmitter

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

Cable type	Wire gauge	Maximum length
Micro Motion 4-wire remote mount	Not applicable	<ul style="list-style-type: none"> <li>1,000 ft (305 m) without Ex-approval</li> <li>500 ft (152 m) with IIC rated sensors</li> <li>1,000 ft (305 m) with IIB rated sensors</li> </ul>
Micro Motion 9-wire remote mount	Not applicable	60 ft (18 m)
User-supplied 4-wire	VDC 22 AWG (0.326 mm <sup>2</sup> )	300 ft (91 m)
	VDC 20 AWG (0.518 mm <sup>2</sup> )	500 ft (152 m)
	VDC 18 AWG (0.823 mm <sup>2</sup> )	1,000 ft (305 m)
	RS-485 22 AWG (0.326 mm <sup>2</sup> ) or larger	1,000 ft (305 m)

## 3 Mounting and sensor wiring

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

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

### 3.2 Mounting transmitters

There is one option available for mounting 1600 remote transmitters:

- Mount the transmitter to an instrument pole.

#### 3.2.1 Mount the transmitter to a wall or flat surface

##### Prerequisites

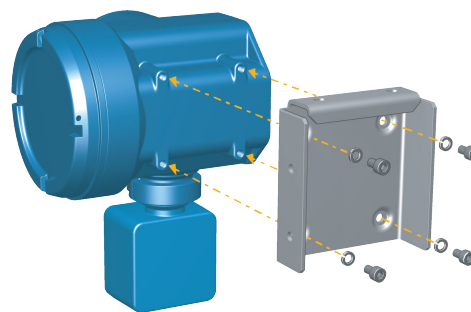
- Emerson recommends 5/16-18 (8 mm–1.25) fasteners that can withstand the process environment. Emerson does not supply bolts or nuts as part of the standard offering (general purpose bolts and nuts are available as an option).
- Ensure that the surface is flat and rigid and that it does not vibrate or move excessively.
- Confirm that you have the necessary tools and the mounting kit shipped with the transmitter.

##### Procedure

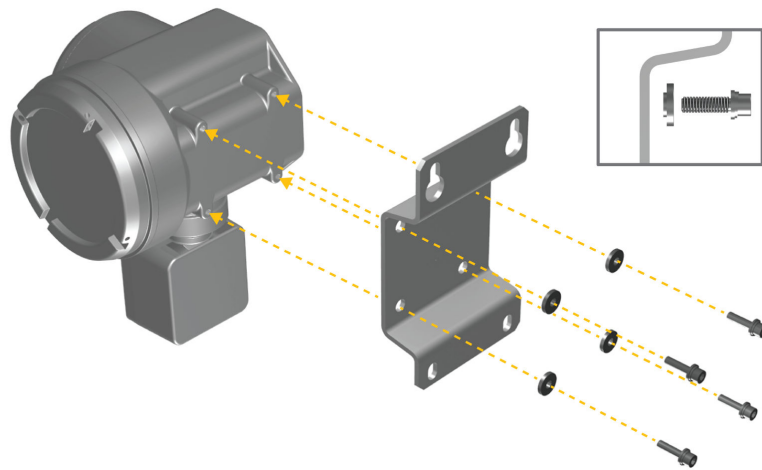
1. Attach the mounting bracket to the transmitter and tighten the screws to 80 in lbf (9.04 N m) to 90 in lbf (10.17 N m).

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**Figure 3-1: Mounting bracket to an aluminum transmitter**

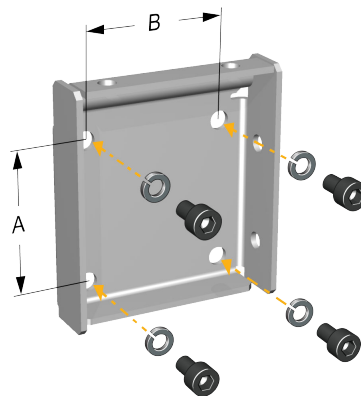


**Figure 3-2: Mounting bracket to a stainless steel transmitter**



2. For wall-mount installations, secure the mounting bracket to the prepared surface.

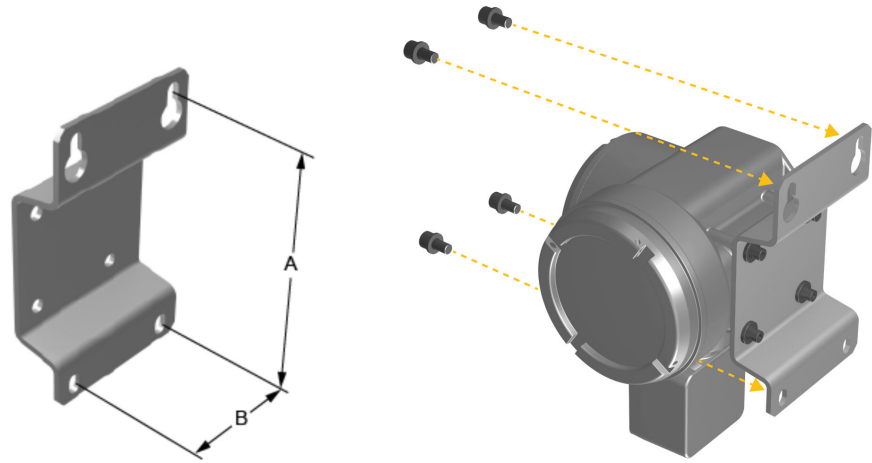
**Figure 3-3: Wall-mounting bracket and dimensions for an aluminum transmitter**



A. 2.8 in (71 mm)

B. 2.8 in (71 mm)

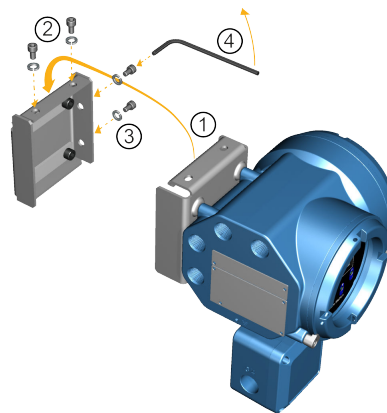
**Figure 3-4: Wall-mounting bracket and dimensions for a stainless steel transmitter**



- A. 7.51 in (190.8 mm)
- B. 3.67 in (93.2 mm)

3. For aluminum transmitters, place and attach the transmitter-mounting bracket to the mounting bracket secured to the wall or instrument pole.

**Figure 3-5: Attaching and securing an aluminum transmitter to the mounting bracket**



**Tip**

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

## 3.2.2 Mount the transmitter to a pole

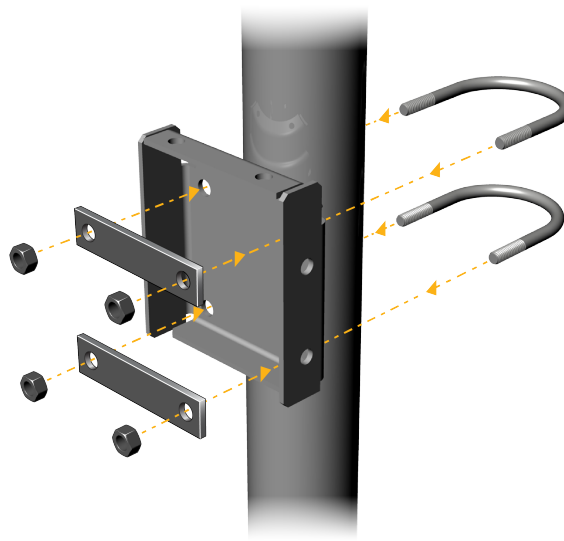
### Prerequisites

- 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.

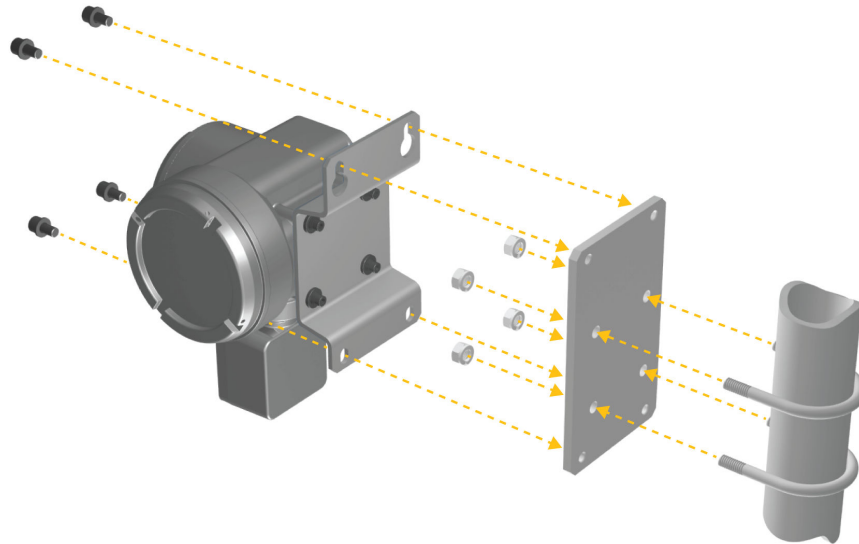
### Procedure

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

**Figure 3-6: Pole-mounting bracket attachment for an aluminum transmitter**



**Figure 3-7: Pole-mounting bracket attachment for a stainless steel transmitter**



### 3.3 Wire a remote-mount transmitter to the sensor

Use this procedure to wire a four-wire or nine-wire remote-mount transmitter to the sensor.

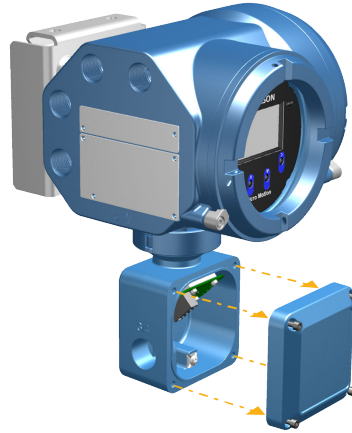
#### Prerequisites

- Prepare the nine-wire cable as described in the [Micro Motion 9-Wire Flow Meter Cable Preparation and Installation Guide](#).
- Connect the cable to the sensor-mounted core processor or junction box as described in the sensor documentation. You can access all product documentation on the documentation DVD shipped with the product or at [Emerson.com](https://www.emerson.com).

### Procedure

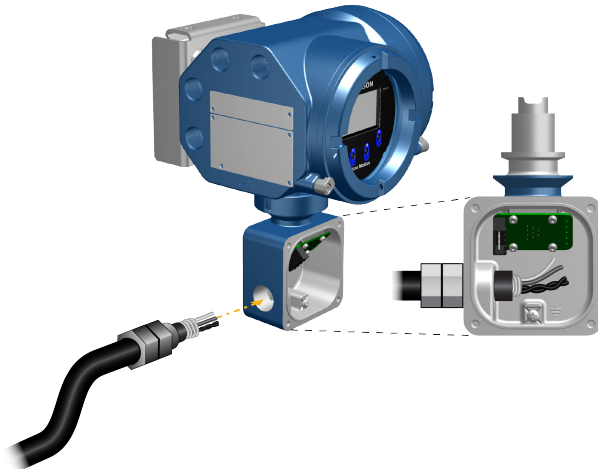
1. Remove the transmitter-to-sensor wiring compartment cover to reveal the terminal connections.

**Figure 3-8: Removal of the transmitter-to-sensor wiring compartment cover**



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

**Figure 3-9: Sensor wiring feedthrough**



3. Connect the sensor wires to the appropriate terminals.

#### **Important**

Terminate the four-wire cable drain wires only at the sensor/core processor end of the cable. See the sensor installation manual for more detail. Do not connect the four-wire cable drain wires to the ground screw located inside the junction box.

- See [Figure 3-10](#) for four-wire terminal connections.
- See [Figure 3-11](#) for nine-wire terminal connections.



Figure 3-10: Four-wire transmitter-to-sensor wiring connections

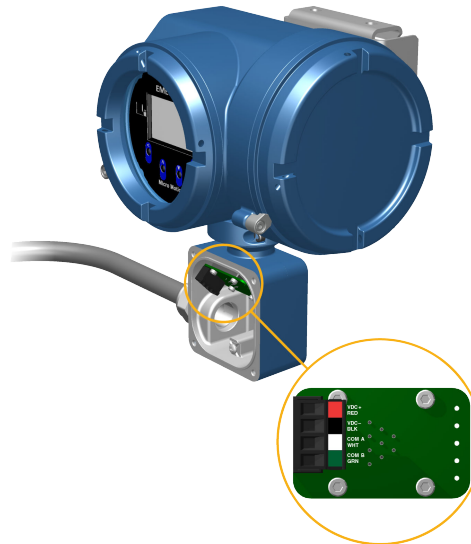
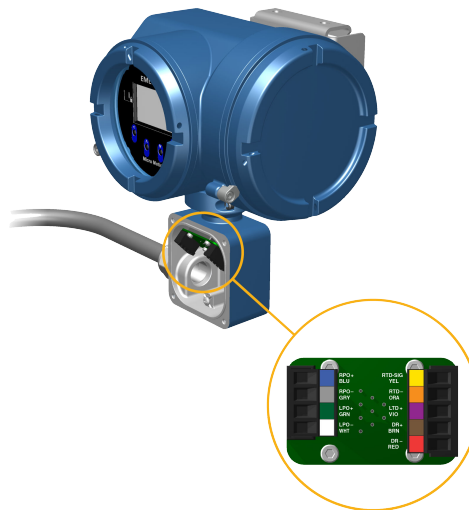


Figure 3-11: Nine-wire transmitter-to-sensor wiring connections



**Note**

Connect the four drain wires in the nine-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 in lbf (1.58 N m) to 15 in lbf (1.69 N m).

## 3.4 Ground the meter components

In 4-wire or 9-wire remote installations, the transmitter and sensor are grounded separately.

### Prerequisites

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#### NOTICE

Improper grounding could cause inaccurate measurements or meter failure.

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#### WARNING

Improper grounding could result in an explosion causing death or serious injury.

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#### Note

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

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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 Coriolis sensor according to the instructions in the sensor installation manual for your Coriolis sensor.
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 outside of the transmitter housing below the transmitter tag.

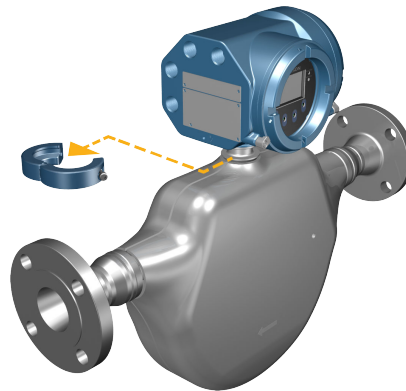
## 3.5 Rotate the transmitter on the sensor (optional)

In integral installations, you can rotate the transmitter on the sensor up to 360° in 45° increments.

### Procedure

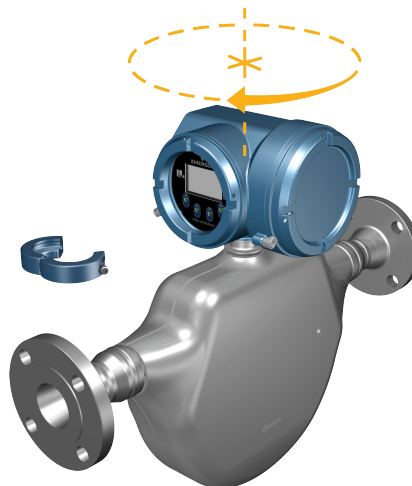
1. Using a 4 mm hex key, loosen and remove the clamp securing the transmitter head in place.

**Figure 3-12: Removal of the sensor clamp**



2. Gently lift the transmitter straight up, and rotate the transmitter to the desired position.  
You can rotate the transmitter to any of the eight positions, but a stop exists that will not allow a full 360° rotation.

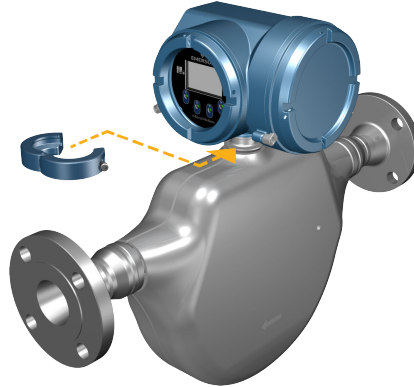
**Figure 3-13: Rotate transmitter head**



3. Gently lower the transmitter onto the base, confirming that the transmitter is in a locked position.

4. Replace the clamp in its original position and tighten the cap screw. Torque to 28 in lbf (3.16 N m) to 30 in lbf (3.39 N m).

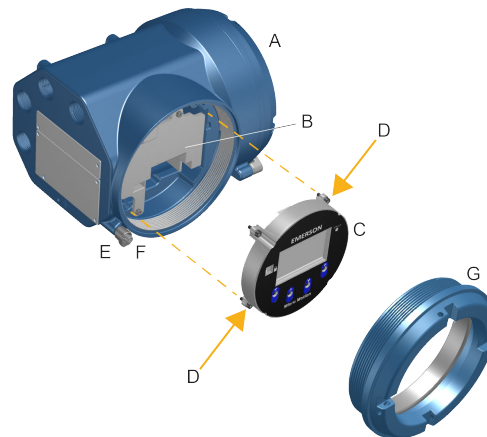
**Figure 3-14: Re-attachment of the sensor clamp**



## 3.6 Rotate the user interface on the transmitter (optional)

The user interface on the transmitter electronics module can be rotated 90°, 180°, or 270° from the original position.

**Figure 3-15: Display components**



- A. Transmitter housing
- B. Sub-bezel
- C. Display module
- D. Display screws
- E. End-cap clamp
- F. Cap screw
- G. Display cover

### Procedure

1. Shut off power to the unit.

**⚠ WARNING**

If the transmitter is in a hazardous area, wait five minutes after disconnecting the power. Failure to do so could result in an explosion causing death or injury.

2. Loosen and rotate the end cap clamp so that it does not interfere with the cover.
3. Turn the display cover counterclockwise to remove it from the main enclosure.
4. Carefully loosen the captive display screws while holding the display module in place.
5. Carefully pull the display module out of the main enclosure.
6. Rotate the display module to the desired position.

7. Gently press the display module back onto the connector.
8. Tighten display screws.
9. Place the display cover onto the main enclosure.
10. Turn the display cover clockwise until it is fully seated.
11. Replace the end-cap clamp by tightening the cap screw.
12. Restore power to the transmitter.

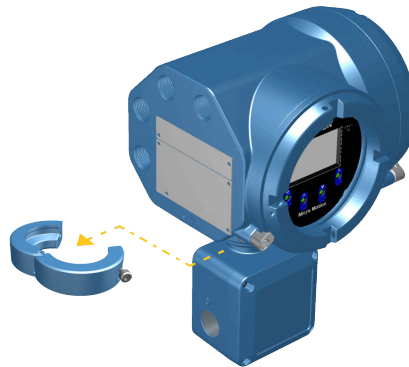
## 3.7 Rotate the sensor wiring junction box on a remote-mount transmitter (optional)

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

### Procedure

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

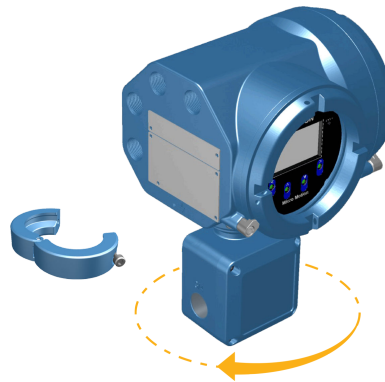
**Figure 3-16: Removal of the clamp**



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

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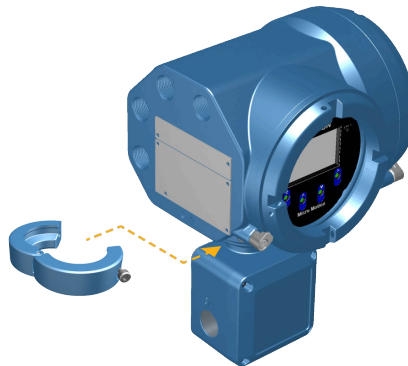
**Figure 3-17: Rotate the transmitter on the junction box**



- 
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. Torque to 28 in lbf (3.16 N m) to 30 in lbf (3.39 N m).

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**Figure 3-18: Re-attach the clamp**





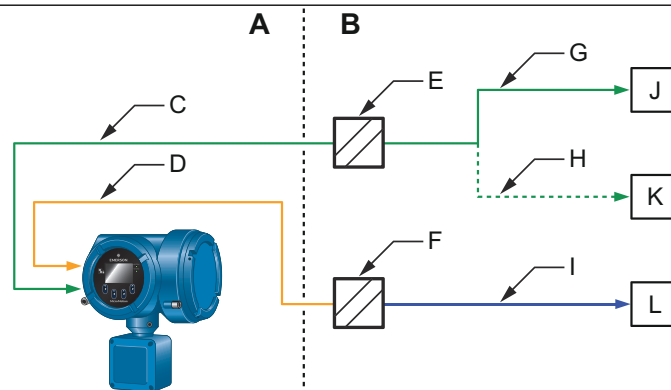


## 4 Wiring the channels

### 4.1 Installation types for the 5700 transmitter

**! WARNING**

If you are installing the transmitter in a hazardous area, refer to Micro Motion approval instructions shipped with the product or available from the Emerson website. Improper installation in a hazardous area can cause an explosion resulting in injury or death.



- A. Hazardous area
- B. Safe area
- C. 2-wire signal cable
- D. PROFIBUS-PA
- E. Barrier
- F. Ex-coupler
- G. 4-20 mA
- H. Frequency Output
- I. PROFIBUS DP
- J. Signal input device
- K. Signal input device
- L. PROFIBUS DP master

### 4.2 Available channels

Signal	Channel A		x		Channel B		Channel C		x	
Wiring terminal	1	2	3	4	5	6	7	8	9	10
Channel options <sup>(1)</sup>	PROFIBUS-PA		x		IS mA output		IS Frequency output		x	

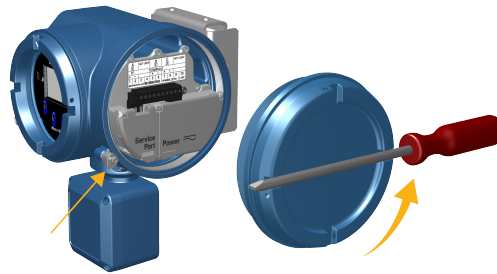
Signal	Channel A	x	Channel B	Channel C	x
				IS Discrete output	

(1) The outputs for Channels B and C are intrinsically safe if powered with an intrinsically safe power supply.

## 4.3 Access the wiring channels


### Procedure

1. Remove the wiring access cover to reveal the inputs and outputs wiring terminal block connectors.



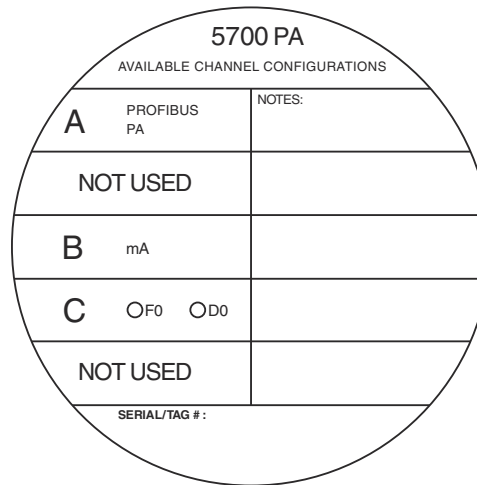
2. Confirm which transmitter channels are activated, or **ON**, and identify the type of configuration you will be wiring to based on the options available.

**Figure 4-1: Activated channel identification**

A		NOT USED		B		C		NOT USED	
<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			
PA					TERMINALS				
+	-			+	-	+	-		
1	2	3	4	5	6	7	8	9	10
MMI-20026183 Rev. AA  CHANNEL <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF									

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

Figure 4-2: Channel and wiring configurations label



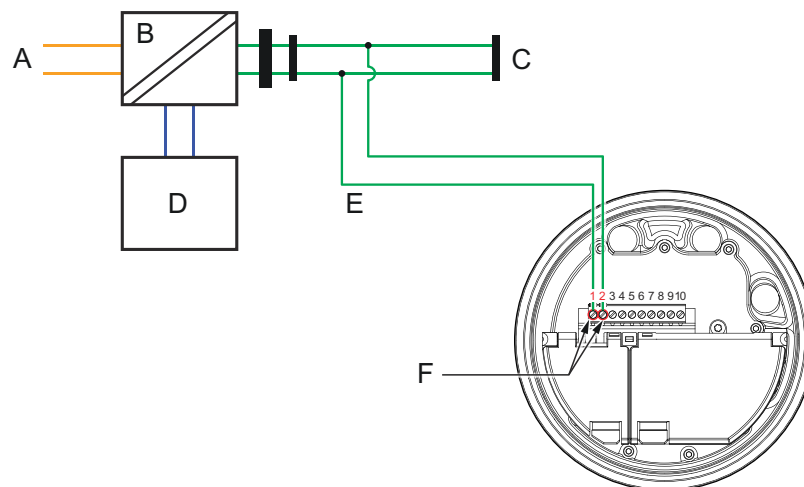
## 4.4 I/O wiring

Use this section to wire a 5700 transmitter with PROFIBUS-PA.

### Important

The transmitter is either FISCO- or FNICO-approved. For FISCO-approved transmitters, a barrier is required.

Figure 4-3: 5700 PROFIBUS-PA wiring

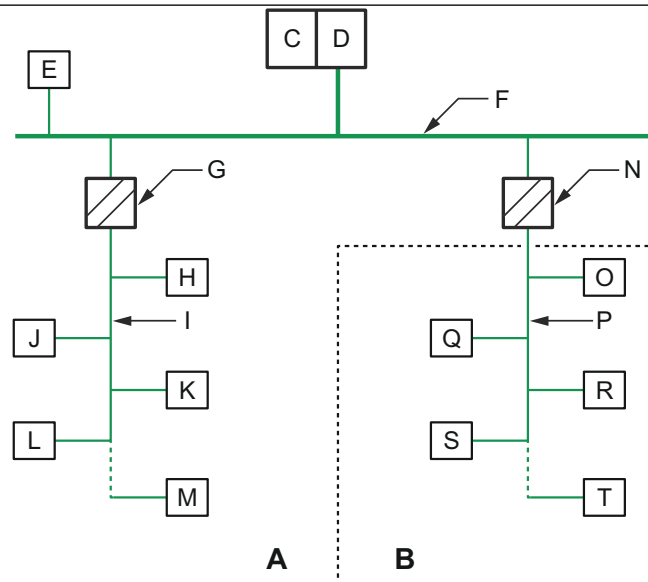


- A. PROFIBUS DP network
- B. DP/PA coupler
- C. PROFIBUS-PA network per wiring specification
- D. Bus power supply
- E. Spur to network wiring specification
- F. Terminals 1 and 2

**Note**

The communication terminals (1 and 2) are not polarity-sensitive.

**Network example**



- A. Non-hazardous area
- B. Hazardous area
- C. Power supply
- D. PROFIBUS DP master (PLC)
- E. DP device
- F. PROFIBUS DP
- G. Standard coupler
- H. PA field device B1
- I. PROFIBUS-PA
- J. PA field device B2
- K. PA field device B3
- L. PA field device B4
- M. PA field device "Bn"
- N. Ex-coupler
- O. PA field device A1
- P. PROFIBUS-PA
- Q. PA field device A2
- R. PA field device A3
- S. PA field device A4
- T. PA field device "An"

## 4.5 FISCO-input entity parameters

Use this section for FISCO-approved input entity parameters.

Parameter	PROFIBUS-PA output
Voltage (Ui)	33V
Current (Ii)	380 mA
Power (Pi)	5.32 W
Internal capacitance (Ci)	0.27 nF
Internal inductance (Li)	5 $\mu$ H

## 4.6 Wiring for nonhazardous installations

Follow these procedures for explosion-proof, nonincendive, or nonhazardous installations.

### 4.6.1 Wire the mA output for nonhazardous installations

#### Prerequisites

#### WARNING

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 4-4: mA Output wiring**



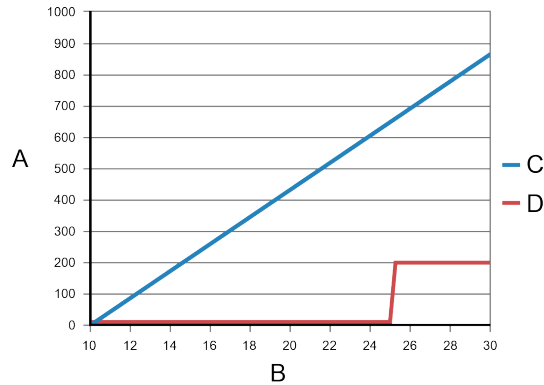
- A. mA Output
- B. Channel B
- C. 10–30 VDC (maximum)
- D. Loop resistor
- E. Measurement device

#### Related information

[mA Output loop resistance](#)

## mA Output loop resistance

Figure 4-5: mA Output: loop resistance



- A. Loop resistor (ohms)
- B. Supply voltage VDC (V)
- C.  $R_{max}$  = maximum value of loop resistor allowed
- D.  $R_{min}$  = minimum value of loop resistance required

### Loop resistance equation

$$R_{max} = (V_{supply} - 10V) / 0.023$$

$$R_{min} = 0 \Omega, V_{supply} \leq 25V$$

$$R_{min} = 200 \Omega, V_{supply} > 25V$$

## 4.6.2

### Wire the Frequency Output or Discrete Output for nonhazardous installations

Wire the Frequency Output or Discrete Output in explosion-proof, nonincendive, or nonhazardous installations.

#### Prerequisites

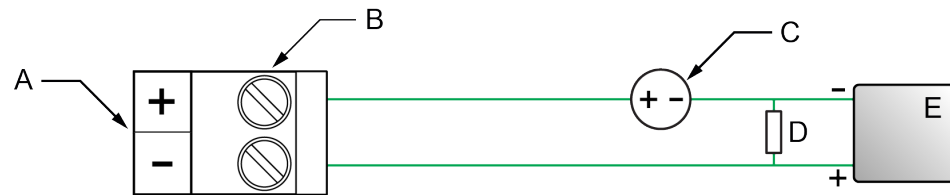
 **WARNING**

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

#### Procedure

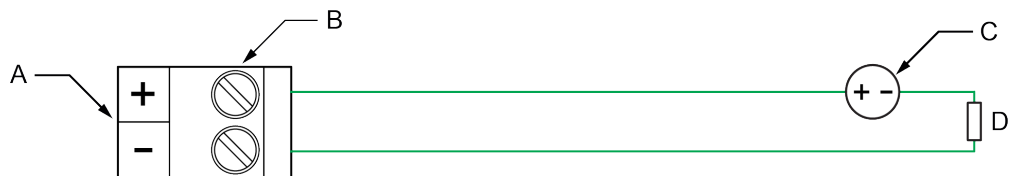
Wire to the appropriate output terminal and pins.

**Figure 4-6: FO and DO wiring when connected to a measurement system**



- A. Frequency Output or Discrete Output
- B. Channel C
- C. 8-30 VDC (maximum)
- D. Load resistor (500 Ω resistance recommended for 24V supply). Use the following equations for other load resistance values:
  - $R_{max} = (V_{supply} - 6V) / 0.003$  (maximum value of load resistor allowed)
  - $R_{min} = 250$  ohms (minimum value of load resistance required)
- E. Counter

**Figure 4-7: DO wiring with a relay or indicator**



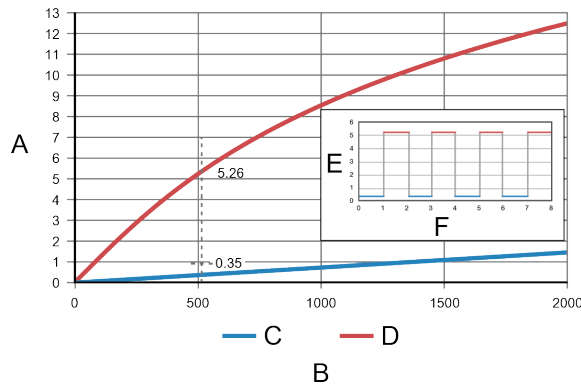
- A. Discrete Output
  - B. Channel C
  - C. 8-30 VDC (maximum)
  - D. Relay or indicator
- $Current = (V_{supply} - 0.8V) / (1690 \text{ ohms} + \text{resistance of } D \text{ in ohms})$

**Related information**

[Frequency Output high and low voltages for nonhazardous installations](#)

## Frequency Output high and low voltages for nonhazardous installations

Figure 4-8: 24VDC supply



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

### High and low voltage equations

$$\text{High voltage} \approx (V_{\text{supply}} - 0.8) * R_L / (1706 + R_L)$$

$$\text{Low voltage} \approx 0.0007 * R_L$$

## 4.7 Wiring for hazardous installations

Follow these instructions for hazardous installations.

### WARNING

Improper wiring in a hazardous environment can cause an explosion. Install the transmitter only in an area that complies with the hazardous classification tag on the transmitter.

### 4.7.1 Hazardous installation parameters

#### Input entity parameters

Parameter	4-20mA Output	Frequency Output and Discrete Output
Voltage ( $U_i$ )	30 V	30 V
Current ( $I_i$ )	484 mA	484 mA
Power ( $P_i$ )	2.05 W	2.05 W



Parameter	4-20mA Output	Frequency Output and Discrete Output
Internal capacitance (Ci)	0.27 nF	11.27 nF
Internal inductance (Li)	5μH	5μH

### Hazardous area voltage

The open circuit voltage for the selected barrier must be less than 30 VDC ( $V_{max} = 30$  VDC).

### Hazardous area current

The short circuit current for the selected barrier must be less than 484 mA ( $I_{max} = 484$  mA).

### Hazardous area capacitance

The 5700 PROFIBUS-PA has the following capacitance (Ci) values:

- mA Output = 0.27nF
- Frequency Output = 11.27nF

This value added to the wire capacitance (C<sub>cable</sub>), must be lower than the maximum allowable capacitance (Ca) specified by the safety barrier.

Use the following equation to calculate the maximum cable length between the transmitter and the barrier:

$$C_i + C_{cable} \leq C_a$$

### Hazardous area inductance

The inductance (Li) of the 5700 PROFIBUS-PA transmitter is 5μH. This value, plus the field wiring inductance (L<sub>cable</sub>) must be lower than the maximum allowable inductance (La) specified by the safety barrier.

Use the following equation to calculate the maximum cable length between the transmitter and the barrier:

$$L_i + L_{cable} \leq L_a$$

## 4.7.2 Wire the mA Output for hazardous installations

### Prerequisites



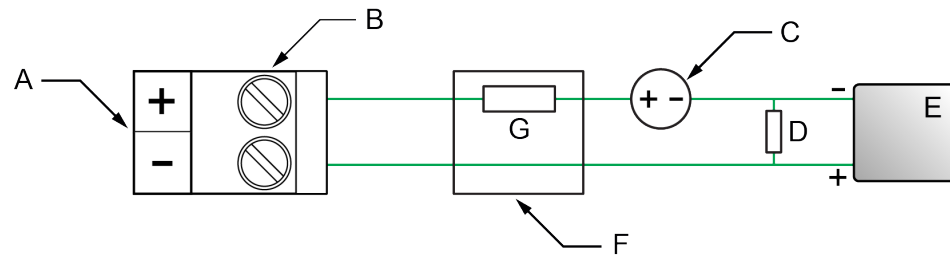
### WARNING

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 4-9: mA Output wiring in a hazardous area**

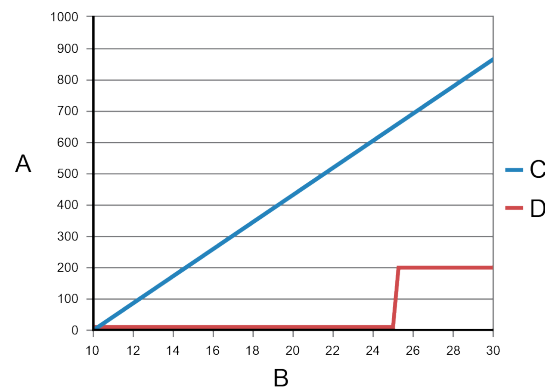


- A. mA Output
- B. Channel B
- C. 10–30 VDC (maximum)
- D. Loop resistor
- E. Measurement device
- F. Safety barrier
- G. Rbarrier

Add the Rbarrier and loop resistor D together to determine the proper Supply Voltage VDC(Volts).

## mA Output loop resistance

**Figure 4-10: mA Output: loop resistance**



- A. Loop resistor (ohms)
- B. Supply voltage VDC (V)
- C.  $R_{max}$  = maximum value of loop resistor allowed
- D.  $R_{min}$  = minimum value of loop resistance required

### Loop resistance equation

$$R_{max} = (V_{supply} - 10V) / 0.023$$

$$R_{min} = 0 \Omega, V_{supply} \leq 25V$$

$$R_{min} = 200 \Omega, V_{supply} > 25V$$

## 4.7.3 Wire the Frequency Output or Discrete Output for hazardous installations

### Prerequisites

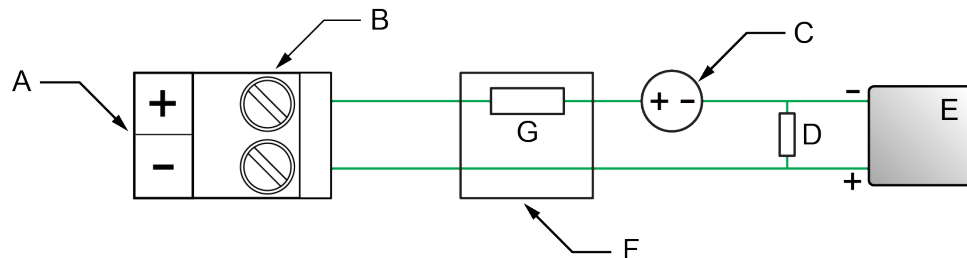
**⚠ WARNING**

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 4-11: FO and DO hazardous wiring**



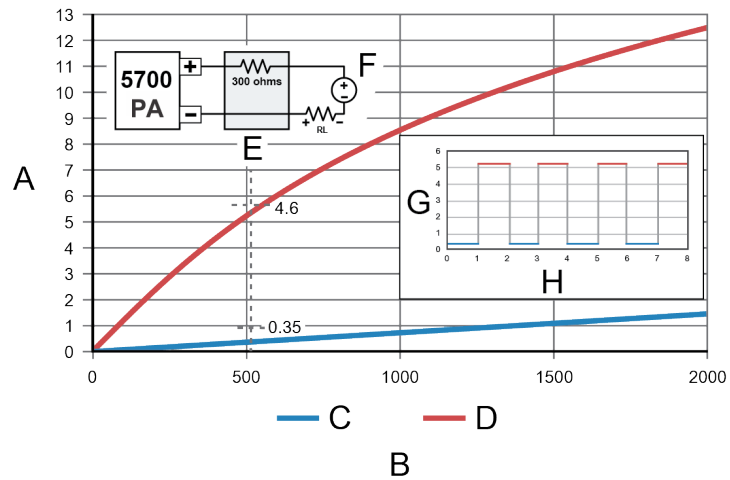
- A. Frequency Output or Discrete Output
- B. Channel C
- C. 8-30 VDC (maximum)
- D. Load resistor (500  $\Omega$  resistance recommended for 24V supply). Use the following equations for other load resistance values:
  - $R_{max} = [(V_{supply} - 6V) / 0.003] - R_{barrier}$  (maximum value of load resistor allowed)
  - $R_{min} = 0$  ohms (minimum value of load resistance required)
- E. Counter
- F. Safety barrier
- G.  $R_{barrier}$

### Related information

[Frequency Output high and low voltages for hazardous installations](#)

## Frequency Output high and low voltages for hazardous installations

Figure 4-12: 24VDC supply with a 300-ohm barrier



- A. Output voltage (V)
- B. Load resistance  $R_L$  ( $\Omega$ )
- C. Low voltage
- D. High voltage
- E. Barrier
- F. Supply voltage
- G. Voltage (volts)
- H. Time

### High and low voltage equations

$$\text{High voltage} \approx (V_{\text{supply}} - 0.8) * R_L / (1706 + R_L + R_{\text{barrier}})$$

$$\text{Low voltage} \approx 0.0007 * R_L$$

## 5 Wiring the power supply

You can install a user-supplied switch in the power supply line.

---

### Important

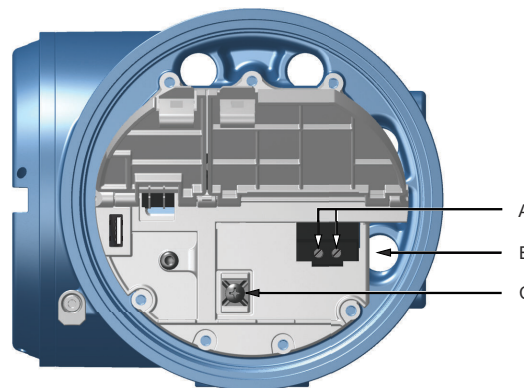
For compliance with the Low Voltage Directive 2014/35/EU (European installations), verify that the transmitter is located in close proximity to a switch.

---

### Procedure

1. Remove the wiring access cover.
  2. Open the **Power** warning flap to locate the power terminals.
- 

**Figure 5-1: Location of power supply wiring terminals and equipment ground**



- A. Power supply wiring terminals (+ and -)  
B. Conduit connection for power supply wiring  
C. Equipment ground
- 

3. Connect the power supply wires.
    - For DC power: connect to terminals + and -.
    - For AC power: connect to terminals L/L1 (line) and N/L2 (neutral).
- 

### NOTICE

Do not use the conduit specified for power supply wires for input/output wiring (see [Figure 5-1](#)) to avoid pinched wires when the cover is closed.

---

4. Tighten the two screws holding the power connector in place.
5. Ground the power supply using the equipment ground, also under the **Power** warning flap.



# 6 Setting the 5700 for PROFIBUS-PA communication

## 6.1 Addressing

Set the 5700 address using either of the following methods:

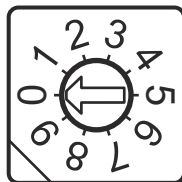
- Locally using rotary switches
- From the software using ProLink III, the display, or from the class 2 PROFIBUS-PA host using the `Set_Slave_Add` command

### 6.1.1 Set the 5700 PROFIBUS-PA using rotary switches

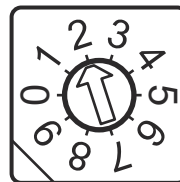
You can use the three rotary switches on the back side of the 5700 display circuit board to assign the transmitter a PROFIBUS-PA hardware address.

The valid hardware address range is 0 to 125. Setting the rotary switches to  $\geq 126$  sets the software address.

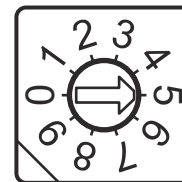
- SW1 = hundreds
- SW2 = tens
- SW3 = ones



SW1



SW2



SW3

#### Example

If the SW1:SW2:SW3 switches are set to 0, 2, and 5 respectively, then the 5700 address is  $(0 \times 100) + (2 \times 10) + (5 \times 1) = 25$ .

#### Hardware addressing considerations

- The 5700 needs to power cycle in order to read the new hardware address.
- A hardware address  $\geq 126$  is an invalid address and the 5700 goes into software addressing.
- If the hardware address shifts from an invalid address ( $\geq 126$ ) to a valid hardware address ( $\leq 125$ ), the 5700 will accept the hardware address, irrespective of the software address setting.
- If the hardware address shifts from a valid address ( $\leq 125$ ) to an invalid hardware address ( $\geq 126$ ), the 5700 will stay at address 126 until the software addressing changes the address.

- The 5700 leaves the factory with the hardware address set at 126.

## 6.1.2 Set the 5700 PROFIBUS-PA with software

Display	Menu → Configuration → Profibus PA Setting → Profibus PA Address
ProLink III	Device Tools → Configuration → Communications → Communication (Profibus PA) → General → Device Address

Set the 5700 software address using any of the following methods:

- From the display
- From ProLink III
- From the class 2 PROFIBUS-PA host using the `Set_Slave_Add` command


You can set the 5700 address using the display or ProLink III only if the hardware rotary switches are > 125. If the 5700 address is changed using ProLink III or the display, the 5700 starts communicating on the new address with a PROFIBUS-PA host after a power cycle.



## 7 Power up the transmitter

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

### Procedure

1.  **WARNING**  
If the transmitter is in a hazardous area, do not remove the housing cover while the transmitter is powered up. Failure to follow these instructions can cause an explosion resulting in injury or death.

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

2. Turn on the electrical power at the power supply.  
The transmitter will automatically perform diagnostic routines. The transmitter is self-switching and will automatically detect the supply voltage. When using DC power, a minimum of 1.5 amps of startup current is required. During this period, Alert 009 is active. The diagnostic routines should complete in approximately 30 seconds. The status LED will turn green and begin to flash when the startup diagnostics are complete. If the status LED exhibits different behavior, an alert is active.

### Postrequisites

Although the sensor is ready to receive process fluid shortly after power-up, the electronics can take up to ten 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 ten minutes before relying on process measurements. During this warm-up period, you may observe minor measurement instability or inaccuracy.



## 8 Guided setup

At initial startup of the transmitter, the guided configuration screen appears on the transmitter display. 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.



## 9 Using the display controls

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

### Procedure

1. To activate an optical switch, block the light by holding your thumb or finger in front of the opening.  
You can activate the optical switch through the lens. Do not remove the transmitter housing cover.

### Important

The transmitter only detects one switch selection at a time. Be sure to place your thumb or finger directly over a single optical switch, and ensure no other switches are being obstructed.

**Figure 9-1: Proper finger positioning for activating an optical switch**



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

### Important

When using the arrow keys, you must first activate the optical switch then release the same switch 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 switch and continue to hold for one second. Release the switch when the desired selection is highlighted.

---

**Figure 9-2: Example 1: Active arrow indicators on the transmitter display**



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**Figure 9-3: Example 2: Active arrow indicators on the transmitter display**



## 10 Available service port connection

Use the service port connection to download or upload data from/to the transmitter.

To access the service port, use:

- Any commonly-available USB drive

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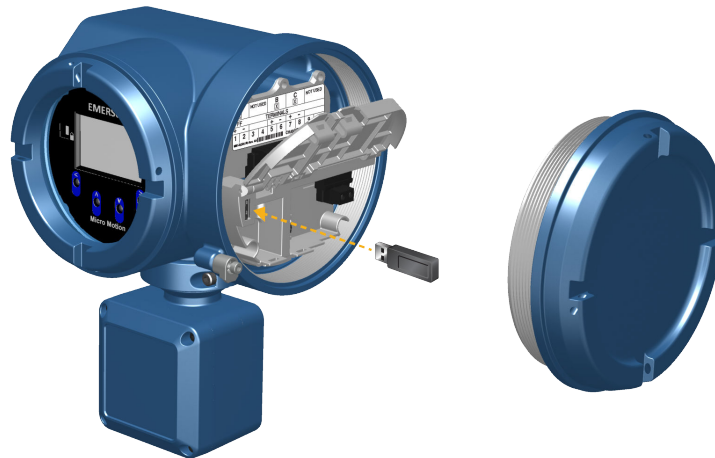
### Note

The USB drive must be in FAT format. The transmitter does not recognize NTFS format.

- The standard USB cable provided by Micro Motion to connect the 5700 transmitter to the PC

### WARNING

If the transmitter is in a hazardous area, do not remove the housing cover while the transmitter is powered up. Failure to follow these instructions can cause an explosion resulting in injury or death.



The service port connection is located under the **Service Port** warning flap at the wiring access points.

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