Micro Motion® Model 5700 Transmitters

FOUNDATION™ Fieldbus Installations
Emerson Flow customer service

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<table>
<thead>
<tr>
<th>North and South America</th>
<th>Europe and Middle East</th>
<th>Asia Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>800-522-6277</td>
<td>Australia</td>
</tr>
<tr>
<td>Canada</td>
<td>+1 303-527-5200</td>
<td>U.K.</td>
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<td>Mexico</td>
<td>+41 (0) 41 7686 111</td>
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</tr>
<tr>
<td>Argentina</td>
<td>+54 11 4837 7000</td>
<td>France</td>
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<tr>
<td>Brazil</td>
<td>+55 15 3413 8000</td>
<td>Germany</td>
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<tr>
<td>Venezuela</td>
<td>+58 26 1731 3446</td>
<td>Central &amp; Eastern</td>
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<tr>
<td>Russian/CIS</td>
<td>+7 495 981 9811</td>
<td>Japan</td>
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<tr>
<td>Egypt</td>
<td>0800 000 0015</td>
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<tr>
<td>Oman</td>
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<tr>
<td>Qatar</td>
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<tr>
<td>Kuwait</td>
<td>663 299 01</td>
<td>Malaysia</td>
</tr>
<tr>
<td>South Africa</td>
<td>800 991 390</td>
<td></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>800 844 9564</td>
<td></td>
</tr>
<tr>
<td>UAE</td>
<td>800 0444 0684</td>
<td></td>
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</tbody>
</table>
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1 Planning

Topics covered in this chapter:

• About this document
• Related documentation
• Installation checklist
• Additional considerations for retrofitting existing installations
• Power requirements

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

You can find all product documentation via the Micro Motion product documentation DVD shipped with the product or at www.micromotion.com.

Table 1-1: Additional documentation and resources

<table>
<thead>
<tr>
<th>Topic</th>
<th>Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor</td>
<td>Sensor documentation</td>
</tr>
<tr>
<td>Transmitter configuration and use</td>
<td><em>Micro Motion Model 5700 Transmitters FOUNDATION™ Fieldbus Configuration and Use Manual</em></td>
</tr>
<tr>
<td>Product Data Sheet</td>
<td><em>Micro Motion Model 5700 Product Data Sheet (PDS)</em></td>
</tr>
<tr>
<td>Modbus configuration</td>
<td><em>Modbus Interface Tool (MIT) — available at <a href="http://www.micromotion.com">www.micromotion.com</a></em></td>
</tr>
</tbody>
</table>
1.3 **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.

- 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:
  - 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 Micro Motion Product Documentation DVD shipped with the product or at [www.micromotion.com](http://www.micromotion.com). Be sure to reference this documentation in addition to the information shown in this guide.

- 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 1000 ft (300 m).

- Ensure that you use the following cable for the different connections:
  - A certified FOUNDATION™ Fieldbus cable for FOUNDATION Fieldbus terminals
  - A twisted-pair instrument cable for all I/O connections

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

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

Following are examples of possible orientations for the transmitter.

**Table 1-2: Possible transmitter orientation**

<table>
<thead>
<tr>
<th>Preferred orientation</th>
<th>Alternate orientations</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Preferred orientation" /></td>
<td><img src="image2.png" alt="Alternate orientation 1" /></td>
</tr>
</tbody>
</table>

- Mount the meter in a location and orientation that satisfies the following conditions:
  - Allows sufficient clearance to open the transmitter housing cover. Micro Motion recommends 8–10 inches (200–250 mm) clearance at the wiring access points.
- Provides clear access for installing cabling to the transmitter.

1.4 Additional considerations for retrofitting existing installations

☐ The transmitter installation may require 3–6 inches (76–153 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.

Micro Motion recommends that you record the following information (if applicable):

<table>
<thead>
<tr>
<th>Variable</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tag</td>
<td></td>
</tr>
<tr>
<td>Mass flow units</td>
<td></td>
</tr>
<tr>
<td>Volume flow units</td>
<td></td>
</tr>
<tr>
<td>Density units</td>
<td></td>
</tr>
<tr>
<td>Temperature units</td>
<td></td>
</tr>
<tr>
<td>Calibration parameters (for 9-wire installations only)</td>
<td></td>
</tr>
<tr>
<td>Flow calibration factor</td>
<td>FCF (Flow Cal or Flow Calibration Factor):</td>
</tr>
<tr>
<td>Density calibration factors</td>
<td>D1:</td>
</tr>
<tr>
<td></td>
<td>D2:</td>
</tr>
<tr>
<td></td>
<td>K1:</td>
</tr>
<tr>
<td></td>
<td>K2:</td>
</tr>
<tr>
<td></td>
<td>TC:</td>
</tr>
<tr>
<td></td>
<td>FD:</td>
</tr>
<tr>
<td>Function block settings</td>
<td></td>
</tr>
<tr>
<td>Channel assignment</td>
<td></td>
</tr>
<tr>
<td>L_Type</td>
<td></td>
</tr>
<tr>
<td>XD_scale (engineering units assignment)</td>
<td></td>
</tr>
</tbody>
</table>

1.5 Power requirements

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

- 85 to 265 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 startup, the power source must provide a minimum of 1.5 amps 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 0.7 amps.

**Cable sizing formula**

\[ M = 18V + (R \times L \times 0.7A) \]

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

**Typical power cable resistance at 68 °F (20 °C)**

<table>
<thead>
<tr>
<th>Wire gauge</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 AWG</td>
<td>0.0050 ( \Omega/ft )</td>
</tr>
<tr>
<td>16 AWG</td>
<td>0.0080 ( \Omega/ft )</td>
</tr>
<tr>
<td>18 AWG</td>
<td>0.0128 ( \Omega/ft )</td>
</tr>
<tr>
<td>20 AWG</td>
<td>0.0204 ( \Omega/ft )</td>
</tr>
<tr>
<td>2.5 mm(^2)</td>
<td>0.0136 ( \Omega/m )</td>
</tr>
<tr>
<td>1.5 mm(^2)</td>
<td>0.0228 ( \Omega/m )</td>
</tr>
<tr>
<td>1.0 mm(^2)</td>
<td>0.0340 ( \Omega/m )</td>
</tr>
<tr>
<td>0.75 mm(^2)</td>
<td>0.0460 ( \Omega/m )</td>
</tr>
<tr>
<td>0.50 mm(^2)</td>
<td>0.0680 ( \Omega/m )</td>
</tr>
</tbody>
</table>

### 1.5.1 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.

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Wire gauge</th>
<th>Maximum length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Motion 4-wire</td>
<td>Not applicable</td>
<td>• 1000 ft (300 m) without Ex-approval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 500 ft (150 m) with IIC rated sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 1000 ft (300 m) with IIB rated sensors</td>
</tr>
<tr>
<td>Micro Motion 9-wire</td>
<td>Not applicable</td>
<td>1000 ft (300 m)</td>
</tr>
<tr>
<td>Cable type</td>
<td>Wire gauge</td>
<td>Maximum length</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>User-supplied 4-wire</td>
<td>VDC 22 AWG (0.35 mm²)</td>
<td>300 ft (90 m)</td>
</tr>
<tr>
<td></td>
<td>VDC 20 AWG (0.5 mm²)</td>
<td>500 ft (150 m)</td>
</tr>
<tr>
<td></td>
<td>VDC 18 AWG (0.8 mm²)</td>
<td>1000 ft (300 m)</td>
</tr>
<tr>
<td></td>
<td>RS-485 22 AWG (0.35 mm²) or larger</td>
<td>1000 ft (300 m)</td>
</tr>
</tbody>
</table>
2 Mounting and sensor wiring

Topics covered in this chapter:

- Mounting and sensor wiring for integral-mount transmitters
- Mount the 4-wire or 9-wire remote-mount transmitters
- Wire the 4-wire or 9-wire remote-mount transmitter to the sensor
- Ground the meter components
- Rotate the transmitter on the sensor (optional)
- Rotate the user interface on the transmitter (optional)
- Rotate the sensor wiring junction box on a remote-mount transmitter (optional)

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 4-wire or 9-wire remote-mount transmitters

2.2.1 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:
  - Micro Motion recommends the use of 5/16-18 (8 mm–1.25) fasteners that can withstand the process environment. Micro Motion 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, 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 inches (305 mm) from a rigid base, and is no more than 2 inches (50.8 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 to 80-90 in-lbs.

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

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

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

**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 4-wire or 9-wire remote-mount transmitter to the sensor

Prerequisites

- Prepare 4-wire or 9-wire cable as described in the sensor documentation.
- Connect the cable to the sensor-mounted core processor or junction box as described in the sensor documentation. You can access all product documentation online via the Micro Motion product documentation DVD shipped with the product or at www.micromotion.com.

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.

3. Connect the sensor wires to the appropriate terminals.

**Note**
Terminate the 4-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 4-wire cable drain wires to the ground screw located inside the 5700 junction box.

- See *Figure 2-7* for 4-wire terminal connections.
- See *Figure 2-8* for 9-wire terminal connections.
Mounting and sensor wiring

Figure 2-7: 4-wire transmitter-to-sensor wiring connections

Figure 2-8: 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 4-wire or 9-wire remote installations, the transmitter and sensor are grounded separately.

**Prerequisites**

⚠️ **CAUTION!**

Improper grounding could cause inaccurate measurements or meter failure.

⚠️ **WARNING!**

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 (2.5 mm²) or larger wire size.
- Keep all ground leads as short as possible, less than 1 Ω 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 internal ground screw is located inside the transmitter-to-sensor wiring compartment.
   - The external ground screw is located on the side of the transmitter located below the transmitter tag.

2.5 Rotate the transmitter on the sensor (optional)

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

1. Using a 4 mm hex key, loosen and remove the clamp securing the transmitter head in place.
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.
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 to 30 in-lbs (2.3 to 3.4 N-m).

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

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**2.6 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.
Procedure

1. Shut off power to the unit.

⚠️ **WARNING!**

If the transmitter is in a hazardous area, wait five minutes after disconnecting the power before opening the enclosure.

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.

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 plus or minus 180\(^\circ\).

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

   Figure 2-13: Removal of the clamp

   ![Figure 2-13: Removal of the clamp](image)

2. Gently rotate the junction box to the desired position.

   You can rotate the junction box plus or minus 180\(^\circ\) to any position.
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 to 30 in-lbs (2.3 to 3.4 N-m).

Figure 2-14: Rotation of the sensor wiring junction box

Figure 2-15: Re-attachment of the clamp
3 Wiring the channels

Topics covered in this chapter:

• Access the wiring channels
• I/O wiring
• FISCO-input entity parameters
• Wiring for nonhazardous installations
• Wiring for hazardous installations

3.1 Access the wiring channels

1. Remove the wiring access cover to reveal the I/O 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 3-1: Activated channel identification

Table 3-1: Available channel configurations

<table>
<thead>
<tr>
<th>Output Channel</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring terminals</td>
<td>1</td>
<td>2</td>
<td>5 6 7 8</td>
</tr>
<tr>
<td>Outputs options</td>
<td>FOUNDATION™ fieldbus</td>
<td>mA Fixed</td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Figure 3-2: Channel and wiring configurations label
3.2 I/O wiring

Use this section to wire a Model 5700 transmitter with FOUNDATION™ fieldbus.

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

**Figure 3-3: Model 5700 FOUNDATION fieldbus wiring**

A. Bus power supply  
B. FOUNDATION fieldbus network per FOUNDATION fieldbus wiring specification  
C. Spur to network per FOUNDATION fieldbus wiring specification  
D. Terminals 1 and 2

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

3.3 FISCO-input entity parameters

Use this section for FISCO-approved input entity parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>FOUNDATION Fieldbus output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Uᵢ)</td>
<td>33V</td>
</tr>
<tr>
<td>Current (Iᵢ)</td>
<td>380 mA</td>
</tr>
<tr>
<td>Power (Pᵢ)</td>
<td>5.32 W</td>
</tr>
</tbody>
</table>
### 3.4 Wiring for nonhazardous installations

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

#### 3.4.1 Wire the mA output for nonhazardous installations

**Prerequisites**

**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.

![mA output wiring diagram](image)

**Figure 3-4: 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 3-5: mA Output: loop resistance

A. Loop resistor (ohms)
B. Supply voltage VDC (V)
C. Rmax = maximum value of loop resistor allowed
D. Rmin = minimum value of loop resistance required

Loop resistance equation

\[ R_{\text{max}} = \frac{(V_{\text{supply}} - 10) \text{V}}{0.023} \]

\[ R_{\text{min}} = \begin{cases} 0 \\Omega, & V_{\text{supply}} \leq 25 \text{V} \\ 200 \\Omega, & V_{\text{supply}} > 25 \text{V} \end{cases} \]

3.4.2 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

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.
**Wiring the channels**

**Figure 3-6: 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:
   - \( R_{\text{max}} = \frac{(V_{\text{supply}} - 6V)}{0.003} \) (maximum value of load resistor allowed)  
   - \( R_{\text{min}} = 250 \text{ ohms} \) (minimum value of load resistance required)  
E. Counter

**Figure 3-7: DO wiring with a relay or indicator**

A. Discrete Output  
B. Channel C  
C. 8-30 VDC (maximum)  
D. Relay or indicator

\[ \text{Current} = \frac{(V_{\text{supply}} - 0.8V)}{(1690 \text{ ohms} + \text{resistance of D in ohms})} \]

**Related information**

*Frequency Output high and low voltages for nonhazardous installations*
Frequency Output high and low voltages for nonhazardous installations

Figure 3-8: 24VDC supply

High and low voltage equations

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

Low voltage $\approx 0.0007 \times RL$

3.5 Wiring for hazardous installations

Follow these instructions for hazardous installations.

⚠️ DANGER!

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.
3.5.1 Hazardous installation parameters

**Input entity parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>4-20mA Output</th>
<th>Frequency Output and Discrete Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Ui)</td>
<td>30 V</td>
<td>30 V</td>
</tr>
<tr>
<td>Current (Ii)</td>
<td>484 mA</td>
<td>484 mA</td>
</tr>
<tr>
<td>Power (Pi)</td>
<td>2.05 W</td>
<td>2.05 W</td>
</tr>
<tr>
<td>Internal capacitance (Ci)</td>
<td>0.27 nF</td>
<td>11.27 nF</td>
</tr>
<tr>
<td>Internal inductance (Li)</td>
<td>5µH</td>
<td>5µH</td>
</tr>
</tbody>
</table>

**Hazardous area voltage**

The open circuit voltage for the selected barrier must be less than 30 VDC (Vmax = 30 VDC).

**Hazardous area current**

The short circuit current for the selected barrier must be less than 484 mA (Imax = 484 mA).

**Hazardous area capacitance**

The Model 5700 FOUNDATION Fieldbus has the following capacitance (Ci) values:

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

This value added to the wire capacitance (Ccable), 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:

\[ Ci + Ccable \leq Ca \]

**Hazardous area inductance**

The inductance (Li) of the Model 5700 FOUNDATION Fieldbus transmitter is 5µH. This value, plus the field wiring inductance (Lcable) 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:

\[ Li + Lcable \leq La \]
3.5.2 Wire the mA Output for hazardous installations

Prerequisites

**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: 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). See mA Output loop resistance.
**mA Output loop resistance**

**Figure 3-10: mA Output: loop resistance**

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

**Loop resistance equation**

\[
R_{\text{max}} = \frac{(V_{\text{supply}} - 10V)}{0.023}
\]

\( R_{\text{min}} = 0 \Omega, \ V_{\text{supply}} \leq 25V \)

\( R_{\text{min}} = 200 \Omega, \ V_{\text{supply}} > 25V \)

**3.5.3 Wire the Frequency Output or Discrete Output for hazardous installations**

**Prerequisites**

**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.
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:
   - $R_{\text{max}} = \frac{(V_{\text{supply}} - 6V)}{0.003} - R_{\text{barrier}}$ (maximum value of load resistor allowed)
   - $R_{\text{min}} = 0$ ohms (minimum value of load resistance required)
E. Counter
F. Safety barrier
G. $R_{\text{barrier}}$

Related information

Frequency Output high and low voltages for hazardous installations
Frequency Output high and low voltages for hazardous installations

Figure 3-12: 24VDC supply with a 300-ohm barrier

A. Output voltage (V)
B. Load resistance RL (Ω)
C. Low voltage
D. High voltage
E. Barrier
F. Supply voltage
G. Voltage (volts)
H. Time

High and low voltage equations

High voltage ≈ (Vsupply – 0.8) * RL / (1706 + RL + Rbarrier)

Low voltage ≈ 0.0007 * RL
4 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), a switch in close proximity to the transmitter is required.

**Procedure**

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

**Figure 4-1: Location of power supply wiring terminals and 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).
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.
Power up the transmitter

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

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

⚠️ **WARNING!**

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.

**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.
6 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.
7 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.

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 7-1: 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 7-2: Example 1: Active arrow indicators on the transmitter display**

**Figure 7-3: Example 2: Active arrow indicators on the transmitter display**
8 Available Service Port connection

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

To interface with 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 Model 5700 transmitter to the PC

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**WARNING!**

If the transmitter is in a hazardous area, do not remove the housing cover while power is being supplied to the unit. Removing the housing cover while power is supplied to the unit could cause an explosion. To access the service port in a hazardous environment, be sure to remove power from the transmitter and wait 5 minutes before removing the housing cover.

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