Micro Motion® Model 3500 Transmitter (MVD) or Model 3300 Peripheral

Installation manual for rack mount
Safety and approval information

This Micro Motion product complies with all applicable European directives when properly installed in accordance with the instructions in this manual. Refer to the EC declaration of conformity for directives that apply to this product. The EC declaration of conformity, with all applicable European directives, and the complete ATEX Installation Drawings and Instructions are available on the internet at [www.micromotion.com](http://www.micromotion.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.micromotion.com/documentation](http://www.micromotion.com/documentation).

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

Other information

Full product specifications can be found in the product data sheet. Troubleshooting information can be found in the transmitter configuration manual. Product data sheets and manuals are available from the Micro Motion web site at [www.micromotion.com/documentation](http://www.micromotion.com/documentation).

Return policy

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

Information on return procedures and forms is available on our web support system at [www.micromotion.com](http://www.micromotion.com), or by phoning the Micro Motion Customer Service department.

Micro Motion customer service

Email:

- Worldwide: [flow.support@emerson.com](mailto:flow.support@emerson.com)
- Asia-Pacific: [APflow.support@emerson.com](mailto:APflow.support@emerson.com)

Telephone:

<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>0870 240 1978</td>
</tr>
<tr>
<td>Mexico</td>
<td>+41 (0) 41 7686 111</td>
<td>France</td>
</tr>
<tr>
<td>Argentina</td>
<td>+54 11 4837 7000</td>
<td>Germany</td>
</tr>
<tr>
<td>Brazil</td>
<td>+55 15 3413 8000</td>
<td>Italy</td>
</tr>
<tr>
<td>Venezuela</td>
<td>+58 26 1731 3446</td>
<td>Central &amp; Eastern</td>
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<tr>
<td></td>
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<td>Russia/CIS</td>
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<tr>
<td></td>
<td></td>
<td>UAE</td>
</tr>
</tbody>
</table>
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Planning

This installation manual explains basic installation guidelines for mounting the Micro Motion® Model 3300 or Model 3500 MVD applications platform in a 19-inch (486.2 mm) rack.

For information on I.S. applications, refer to Micro Motion approval documentation. For complete instructions about configuration, maintenance, and service, refer to the instruction manual shipped with the transmitter.

⚠️ **WARNING!**

**Improper installation in a hazardous area can cause an explosion.**

For information about hazardous applications, refer to the appropriate Micro Motion approval documentation, shipped with the meter or available from the Micro Motion web site.

⚠️ **WARNING!**

**Hazardous voltage can cause severe injury or death.**

Install transmitter and complete all wiring before supplying power.

⚠️ **CAUTION!**

**Improper installation can cause measurement error or meter failure.**

Follow all instructions.

1.1 Installation kit

For mounting in a rack, the Model 3300 or Model 3500 installation kit includes the following parts:

- One DIN 41612/IEC 60603-2, Type D connector for input/output wiring, with solder tails (Model 3300 only) or screw terminals
- (Model 3500 only) One DIN 41612/IEC 60603-2, keyed Type D connector for sensor wiring with screw terminals
- One plug-in connector for power supply wiring
- Four Model 3300 or six Model 3500 slotted cheese-head machine screws, size M2.5x8, for securing wiring connectors to the rack
1.2 Choose a location

Choose a location for the transmitter based on the requirements described below.

1.2.1 Environmental requirements

Install the transmitter where ambient temperature is between −4 and +140 °F (−20 and +60 °C).

If multiple applications platforms are installed, provide at least 1 U (1 HE) of vertical space between racks to ensure proper ventilation. See Figure 1-1.

Figure 1-1: Space requirements for proper ventilation

1.2.2 Dimensions

The Model 3300 or Model 3500 has the following dimensions. See Figure 1-2:

- Height: 128 mm (3 U or 3 HE)
- Width: 142 mm (28 HP or 28 TE)
- Depth: 160 mm

The Model 3300 or Model 3500 conforms to DIN standard EN 60297-3-101 (IEC 60297-3-101) for 19-inch (486.2 mm) racks. Up to three enclosures fit into one rack. See Figure 1-1.
1.3 Cable lengths

Maximum cable length from the sensor to the Model 3500 transmitter depends on the installation type and cable type.

<table>
<thead>
<tr>
<th>Installation type</th>
<th>Maximum cable length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-wire remote transmitter</td>
<td>Figure 1-3, and Table 1-1 for maximum length of the 4-wire cable</td>
</tr>
<tr>
<td>Remote core processor with remote transmitter</td>
<td>Figure 1-4, and Table 1-1 for maximum length of the 4-wire cable and the 9-wire cable</td>
</tr>
</tbody>
</table>
If you are installing the Model 3300 applications peripheral in combination with a transmitter, the maximum cable length from the transmitter’s frequency output to the Model 3300’s frequency input is 500 feet (150 meters).

**Figure 1-3: 4-wire remote transmitter**

![4-wire remote transmitter diagram](image)

**Figure 1-4: Remote core processor with remote transmitter**

![Remote core processor with remote transmitter diagram](image)

**Table 1-1: Maximum cable lengths between sensor and transmitter**

<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>60 ft (20 m)</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>
1.4 Install guide rails and wiring connectors

1.4.1 Guide rails

Positions of guide rails and wiring connectors are indicated in Figure 1-5. Centers of guide rails should be 27 HP (27 TE) apart, for example, at 1 HP (TE) and 28 HP (TE).

1.4.2 Wiring connectors

The applications platform is shipped with the following equipment:

<table>
<thead>
<tr>
<th>Model type</th>
<th>Equipment</th>
</tr>
</thead>
</table>
| Model 3300 | • A solder-tail or screw-type connector for input/output wiring  
            | • A plug-in connector for power-supply wiring |
| Model 3500 | • A screw-type connector for input/output wiring  
            | • A screw-type connector for sensor wiring     
            | • A plug-in connector for power-supply wiring  |

1. Working from the front of the rack, use the supplied M2.5x8 screws to install the wiring connectors onto the back of the rack.
   - The Model 3500 has six M2.5x8 screws and three connectors
   - The Model 3300 has four M2.5x8 screws

2. Use the centers of the guide rails as reference points and refer to Figure 1-5. Guide rail centers should be 27 HP (27 TE) apart; for example, 1 HP (1 TE) and 28 HP (28 TE).

3. Install the input/output wiring connector at 4 HP (4 TE) from the neighboring unit or from the edge of the rack.

4. (Model 3500 only) Install the keyed sensor wiring connector at 16 HP (16 TE) from the neighboring unit or from the edge of the rack.

5. Install the power supply wiring connector at 25 HP (25 TE) from the neighboring unit or from the edge of the rack.
1.5 Install the Model 3500 or Model 3300 in the rack

1. Align the Model 3500 or Model 3300 with the guide rails.
2. Slide the Model 3500 or Model 3300 into the rack. Make sure the pins on the back panel make contact with the wiring connectors.
3. Tighten the supplied captive screws to secure the front panel of the Model 3500 or Model 3300 to the guide rails.
2 Mounting

2.1 Mount the core processor

Use this section only if you are installing a remote transmitter using a remote core processor or a remote enhanced core processor. See Figure 1-4. If you have a 4-wire remote installation, go to Section 3.1.

Figure 2-1 shows the remote core processor and mounting bracket. Using the mounting bracket, mount the core processor in a location compatible with the cable length requirements discussed in Section 1.2.

Figure 2-1: Remote core processor components
3 Wiring

3.1 Connect input and output wiring

Connect input and output wiring to the appropriate terminals on the input/output wiring connector, which is the far right connector. Refer to Table 3-1 and to the card that is inserted into the sleeve on the top panel (shown in Figure 3-1).

- Use 24 to 16 AWG (0.25 to 1.5 mm²) twisted-pair shielded wire.
- Ground the shields at a single point only.

Table 3-1: Input/output wiring terminals

<table>
<thead>
<tr>
<th>Terminal number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>c 2+ a 2 –</td>
<td>Primary 4–20 mA output / HART</td>
</tr>
<tr>
<td>c 4 + a 4 –</td>
<td>Secondary 4–20 mA output</td>
</tr>
<tr>
<td>c 6 + a 6 –</td>
<td>Frequency input</td>
</tr>
<tr>
<td>c 8 + a 8 –</td>
<td>Discrete input 1</td>
</tr>
<tr>
<td>c 10 + a 10 –</td>
<td>Discrete input 2</td>
</tr>
<tr>
<td>c 12 + a 12 –</td>
<td>Frequency output</td>
</tr>
<tr>
<td>c 14 + a 14 –</td>
<td>Discrete output 1</td>
</tr>
<tr>
<td>c 16 + a 16 –</td>
<td>Discrete output 2</td>
</tr>
<tr>
<td>c 18 + a 18 –</td>
<td>Discrete output 3</td>
</tr>
<tr>
<td>c 32 (B line) a 32 (A line)</td>
<td>RS-485 output</td>
</tr>
</tbody>
</table>

Figure 3-1: Input/output wiring terminal card

3.2 Connect the Model 3500 to the sensor

If you are installing the Model 3300 applications peripheral, this step is not required. Go to Section 3.4.

To connect the Model 3500 transmitter to a Micro Motion sensor, follow the following instructions.
3.2.1 Installation options

Sensor wiring depends on the installation configuration:

- 4-wire remote transmitter (requires a 4-wire cable; see Figure 1-3 and Wiring instructions for 4-wire remote installations)
- Remote core processor with remote transmitter (requires both a 4-wire and a 9-wire cable; see Figure 1-4 and Wiring instructions for remote core processor with remote transmitter installations)

3.2.2 Wiring instructions for 4-wire remote installations

1. Prepare the cable as described in the sensor documentation.
2. Connect the cable to the core processor as described in the sensor documentation.
3. To connect the cable to the transmitter:
   a. Identify the wires in the 4-wire cable.

   Use the 4-wire cable supplied by Micro Motion. This cable consists of one pair of 18 AWG (0.75 mm²) wires (red and black) for the VDC connection, and one pair of 22 AWG (0.35 mm²) wire (green and white) for the RS-485 connection.

   b. Connect the four wires from the core processor to the appropriate terminals on the transmitter.

   See Table 3-2 and Figure 3-2 (standard core processor) or Figure 3-3 (enhanced core processor).

   - Do not leave bare wires exposed.
   - Do not ground the shield, braid, or drain wires at the transmitter.

Table 3-2: Transmitter terminals for 4-wire cable

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Wire color(1)</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>c 4</td>
<td>Red</td>
<td>VDC+</td>
</tr>
<tr>
<td>a 4</td>
<td>Black</td>
<td>VDC−</td>
</tr>
<tr>
<td>c 6</td>
<td>White</td>
<td>RS-485A</td>
</tr>
<tr>
<td>a 6</td>
<td>Green</td>
<td>RS-485B</td>
</tr>
</tbody>
</table>

(1) Wire colors apply to only 4-wire cable supplied by Micro Motion.
3.2.3 Wiring instructions for remote core processor with remote transmitter installations

There are two phases to this procedure:

- Wiring the remote core processor to the transmitter
- Wiring the sensor to the remote core processor
To wire the remote core processor to the transmitter:

1. Use one of the following methods to shield the wiring.

<table>
<thead>
<tr>
<th>Installation method</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unshielded wiring in continuous metallic conduit that provides 360° termination shielding for the enclosed wiring</td>
<td>Go to Step 8</td>
</tr>
<tr>
<td>A user-supplied cable gland with shielded cable or armored cable, terminate the shields in the cable gland. Terminate both the armored braid and the shield drain wires in the cable gland</td>
<td>Go to Step 8</td>
</tr>
<tr>
<td>A Micro Motion-supplied cable gland at the core processor housing</td>
<td>Go to Step 2</td>
</tr>
</tbody>
</table>

2. Do one of the following:
   - If you are using shielded cable, prepare the cable and apply shielded heat shrink as described in Step 6. The shielded heat shrink provides a shield termination suitable for use in the gland when using cable whose shield consists of foil and not a braid. Go to Step 3.
   - If you are using armored cable, prepare the cable as described in Step 6, but do not apply heat shrink – omit Steps 6d, e, f, and g. Go to Step 3.

3. Identify the components shown in Figure 2-1.
4. Remove the core processor lid.
5. Slide the gland nut and the clamping insert over the cable. See Figure 3-4.
6. For connection at the core processor housing, prepare shielded cable as follows (for armored cable, omit steps d, e, f, g):
   a. Strip 4 1/2 inches (114 mm) of cable jacket.
   b. Remove the clear wrap that is inside the cable jacket, and remove the filler material between the wires.
   c. Remove the foil shield that is around the insulated wires, leaving 3/4 inch (19 mm) of foil or braid and drain wires exposed, and separate the wires.
   d. Wrap the shield drain wires around the exposed foil twice. Cut off the excess wire.
   e. Place the shielded heat shrink over the exposed shield drain wires. The tubing should completely cover the drain wires.
   f. Without burning the cable, apply heat (250 °F or 120 °C) to shrink the tubing. See Figure 3-6.
g. Position gland clamping insert so the interior end is flush with the heat shrink.

h. Fold the cloth shield or braid and drain wires over the clamping insert and approximately 1/8 inch (3 mm) past the O-ring. See Figure 3-7.

i. Install the gland body into the core processor housing conduit opening. See Figure 3-8.

7. Insert the wires through the gland body and assemble the gland by tightening the gland nut.

8. Identify the wires in the 4-wire cable.
   Use the 4-wire cable supplied by Micro Motion. This cable consists of one pair of 18 AWG (0.75 mm²) wires (red and black) for the VDC connection, and one pair of 22 AWG (0.35 mm²) wires (green and white) for the RS-485 connection.

9. Connect the four wires to the numbered slots on the core processor. Figure 3-9.
10. Connect the core processor housing internal ground screw if earth ground is required. Earth ground is required if the core processor cannot be grounded via sensor piping, and local codes require internal ground connections. Do not connect shield drain wires to this terminal.

11. Reinstall and tighten the core processor lid.

**WARNING!**
Do not twist the core processor, as this will damage the sensor.

12. To connect the cable to the transmitter, connect the four wires from the core processor to the appropriate terminals on the transmitter.

   See Table 3-2 and Figure 3-2.
   - Do not leave bare wires exposed.
   - Do not ground the shield, braid, or drain wires at the transmitter.

### 3.3 Wire the sensor to the remote core processor

**CAUTION!**
Do not allow the shield drain wires to contact the sensor junction box, as this can cause meter errors.

1. Refer to Micro Motion’s 9-Wire Flowmeter Cable Preparation and Installation Guide for instructions on cable shielding and preparation:
   - At the sensor end, follow the instructions for your cable type.
   - At the core processor end, follow the instructions for your cable type with an MVD transmitter.

2. To connect the wires, refer to Micro Motion’s 9-Wire Flowmeter Cable Preparation and Installation Guide and follow the instructions for your sensor with an MVD transmitter.
Additional information for connecting the wires at the core processor is provided below:

a. Identify the components shown in Figure 2-1.
b. Remove the core processor’s end-cap.
c. Insert the 9-wire cable through the conduit opening.
d. Connect the wires to the plugs supplied with the core processor.
e. Insert the plugs into the sockets inside the lower conduit ring. See Figure 3-10.

3. Ground the cable.

<table>
<thead>
<tr>
<th>Cable type</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacketed cable</td>
<td>Ground the shield drain wires (the black wire) only on the core processor end, by connecting it to the ground screw inside the lower conduit ring. Do not ground to the core processor’s mounting screw. Do not ground the cable at the sensor junction box.</td>
</tr>
<tr>
<td>Shielded or armored cable</td>
<td>Ground the shield drain wires (the black wire) only on the core processor end, by connecting it to the ground screw inside the lower conduit ring. Do not ground to the core processor’s mounting screw. Do not ground the cable at the sensor junction box. Ground the cable braid on both ends, by terminating it inside the cable glands.</td>
</tr>
</tbody>
</table>

4. Ensure integrity of gaskets, grease all O-rings, then close the junction box housing and core processor end-cap, and tighten all screws.

⚠️ CAUTION!
Make sure that the wires are not caught or pinched when you close the housing to reduce the risk of measurement error or meter failure.
3.4 Connect the power supply wiring

⚠️ CAUTION!

- Do not install power supply wiring in the same cable tray or conduit as the input/output wiring to avoid device failure or measurement error.
- Shut off the power supply before installing the applications platform.
- Make sure the power supply voltage matches the voltage that is indicated on the power supply wiring terminals. See Figure 3-11.

Connect the Model 3300 or Model 3500 to a power supply as follows:
1. Use 18 to 14 AWG (0.75 to 2.5 mm²) wire.
2. Ground the transmitter as follows:
   - Connect the ground wire to the middle terminal.
   - Connect the power supply ground directly to earth ground.
   - Keep all ground leads as short as possible.
   - Ensure that all ground wiring has less than 1 ohm impedance.
3. Connect wires to the upper and lower terminals.
4. (Optional). Install a user-supplied switch in the power supply line.
   In Europe, install the switch close to the Model 3300 or Model 3500 in order to comply with low-voltage directive 2006/95/EC. For details, see standard EN 61010-1:2010 clause 5.4.3.d.

Figure 3-11: Power supply wiring terminals

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Terminal designations for AC power
Terminal designations for DC power