

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 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.

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.

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, or by phoning the Micro Motion Customer Service department.

Micro Motion customer service

Email:

- Worldwide: flow.support@emerson.com
- Asia-Pacific: APflow.support@emerson.com

Telephone:

North and South America		Europe and Middle East		Asia Pacific	
United States	800-522-6277	U.K.	0870 240 1978	Australia	800 158 727
Canada	+1 303-527-5200	The Netherlands	+31 (0) 704 136 666	New Zealand	099 128 804
Mexico	+41 (0) 41 7686 111	France	0800917901	India	800 440 1468
Argentina	+54 11 4837 7000	Germany	0800 182 5347	Pakistan	888 550 2682
Brazil	+55 15 3413 8000	Italy	8008 77334	China	+86 21 2892 9000
Venezuela	+58 26 1731 3446	Central & Eastern	+41 (0) 41 7686 111	Japan	+81 3 5769 6803
		Russia/CIS	+7 495 981 9811	South Korea	+82 2 3438 4600
		Egypt	0800 000 0015	Singapore	+65 6 777 8211
		Oman	800 70101	Thailand	001 800 441 6426
		Qatar	431 0044	Malaysia	800 814 008
		Kuwait	663 299 01		
		South Africa	800 991 390		
		Saudia Arabia	800 844 9564		
		UAE	800 0444 0684		

Contents

Chapter 1	Planning	5
1.1	Installation kit	5
1.2	Choose a location.....	6
1.3	Cable lengths	7
1.4	Install guide rails and wiring connectors	9
1.5	Install the Model 3500 or Model 3300 in the rack	10
Chapter 2	Mounting	11
2.1	Mount the core processor	11
Chapter 3	Wiring	13
3.1	Connect input and output wiring	13
3.2	Connect the Model 3500 to the sensor	13
3.3	Wire the sensor to the remote core processor.....	19
3.4	Connect the power supply wiring	21

1 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.

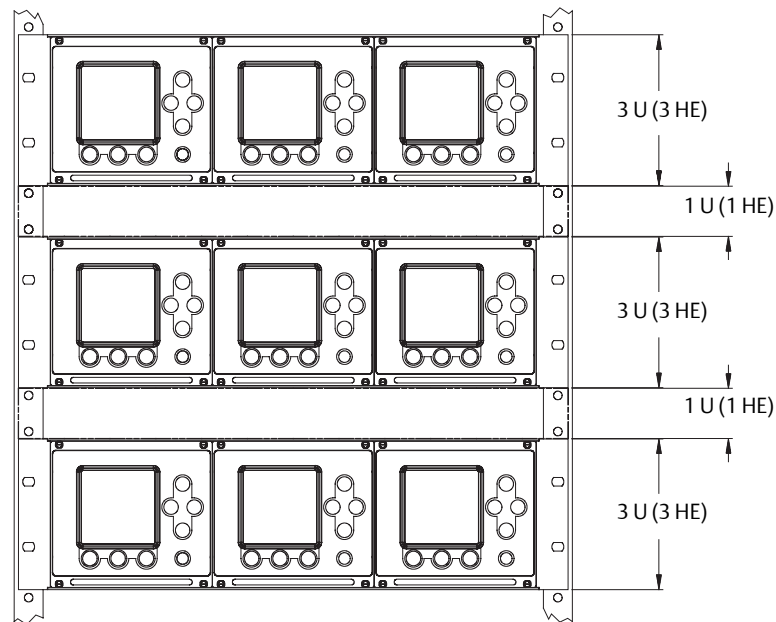
1.2.1 Environmental requirements

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 U = 1 HE = 1.750 inches (44,5 mm)



1.2.2 Dimensions

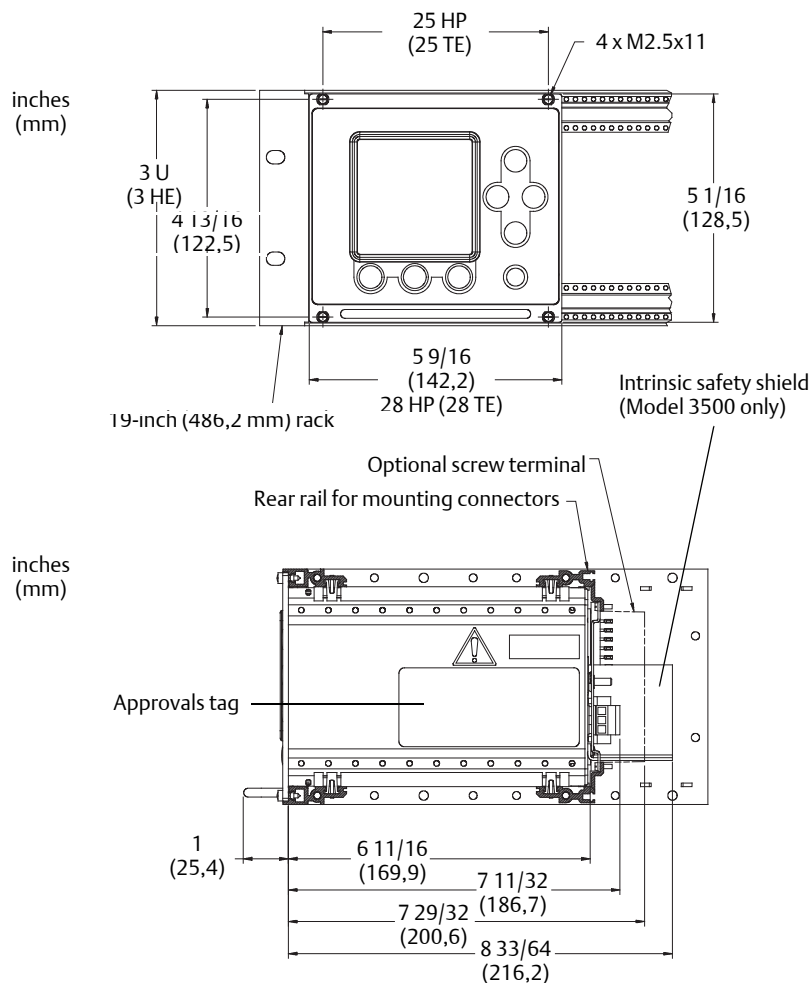
The Model 3300 or Model 3500 has the following dimensions. See [Figure 1-2](#):

- 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](#).

Figure 1-2: Dimensions for mounting in rack

1 U = 1 HE = 1.750 inches (44,5 mm)
 1 HP = 1 TE = 0.200 inch (5,1 mm)



1.3 Cable lengths

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

Installation type	Maximum cable length
4-wire remote transmitter	<i>Figure 1-3</i> , and <i>Table 1-1</i> for maximum length of the 4-wire cable
Remote core processor with remote transmitter	<i>Figure 1-4</i> , and <i>Table 1-1</i> for maximum length of the 4-wire cable and the 9-wire cable

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

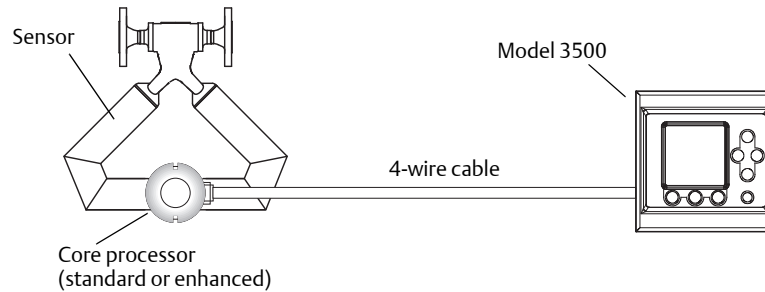


Figure 1-4: Remote core processor with remote transmitter

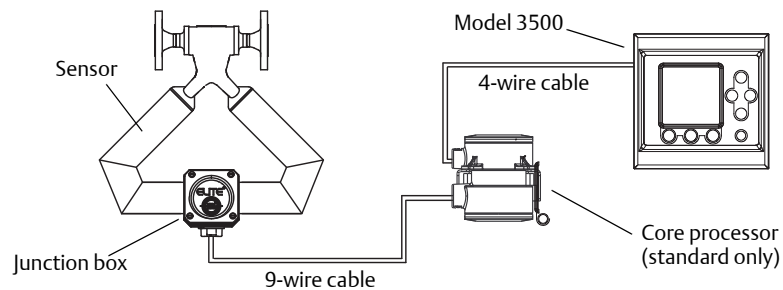


Table 1-1: Maximum cable lengths between sensor and transmitter

Cable type	Wire gauge	Maximum length
Micro Motion 4-wire	Not applicable	<ul style="list-style-type: none"> • 1000 ft (300 m) without Ex-approval • 500 ft (150 m) with IIC-rated sensors • 1000 ft (300 m) with IIB-rated sensors
Micro Motion 9-wire	Not applicable	60 ft (20 m)
User-supplied 4-wire	VDC 22 AWG (0.35 mm ²)	300 ft (90 m)
	VDC 20 AWG (0.5 mm ²)	500 ft (150 m)
	VDC 18 AWG (0.8 mm ²)	1000 ft (300 m)
	RS-485 22 AWG (0.35 mm ²) or larger	1000 ft (300 m)

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).

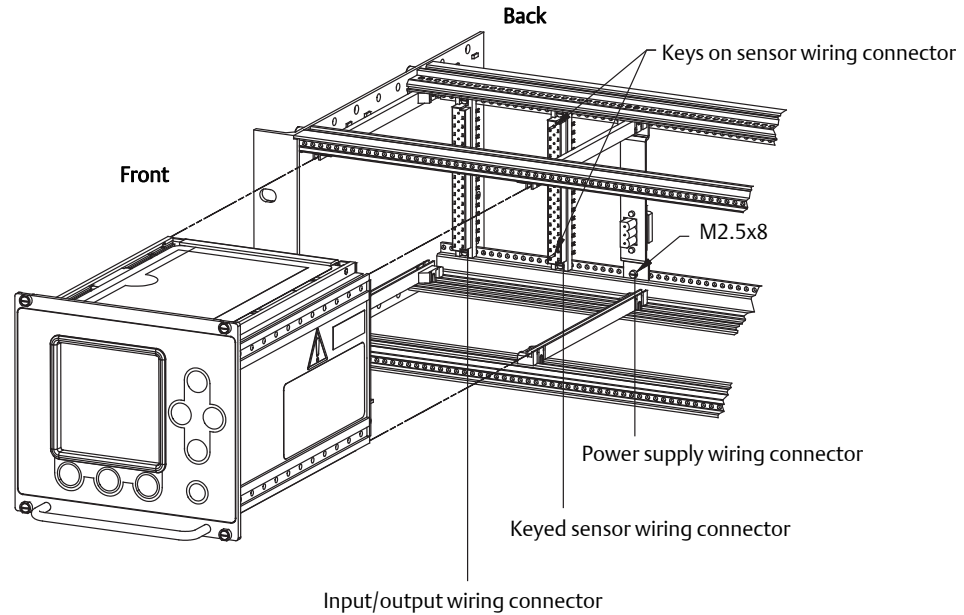
1.4.2 Wiring connectors

The applications platform is shipped with the following equipment:

Model type	Equipment
Model 3300	<ul style="list-style-type: none"> • A solder-tail or screw-type connector for input/output wiring • A plug-in connector for power-supply wiring
Model 3500	<ul style="list-style-type: none"> • 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.

Figure 1-5: Positions of guide rails and wiring connectors



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.

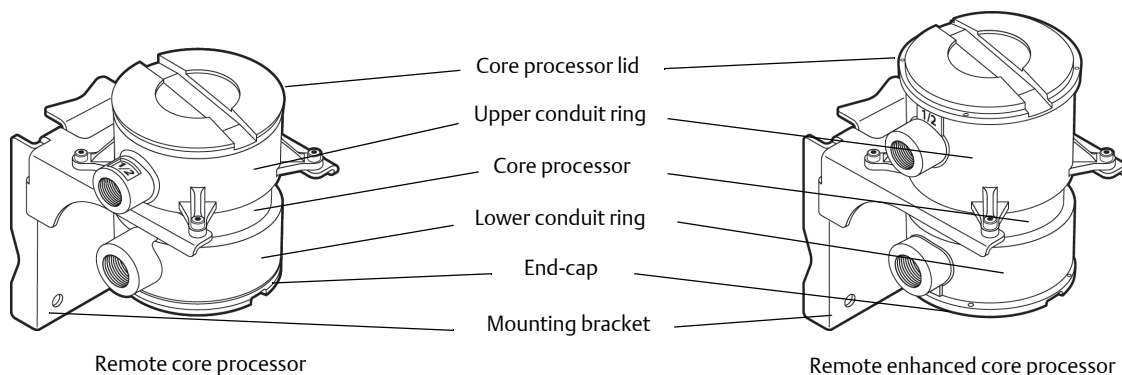
2 Mounting

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

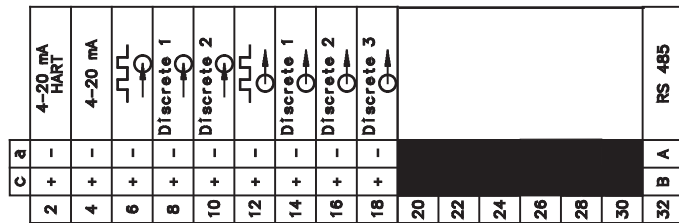
Connect input and output wiring to the appropriate terminals on the input/output wiring connector, which is the far right connector. Refer to [Table 3-1](#) and to the card that is inserted into the sleeve on the top panel (shown in [Figure 3-1](#)).

- 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

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

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.

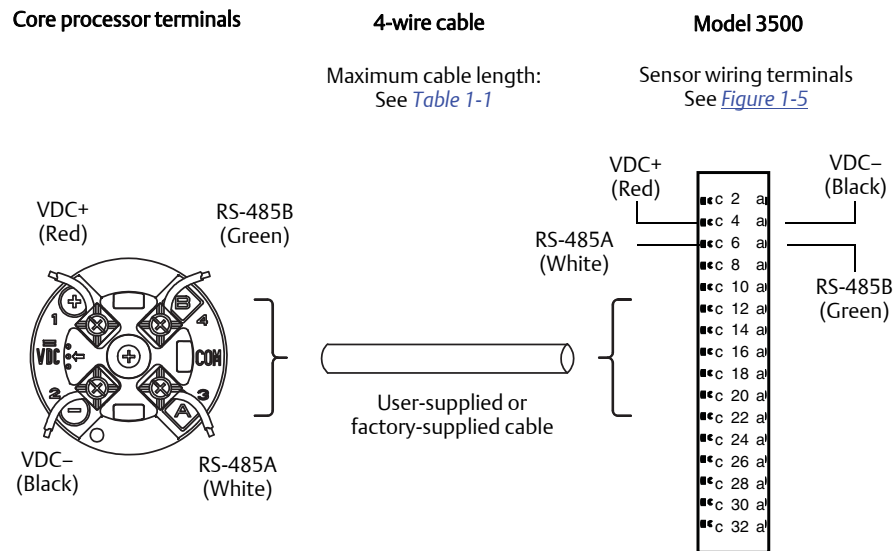
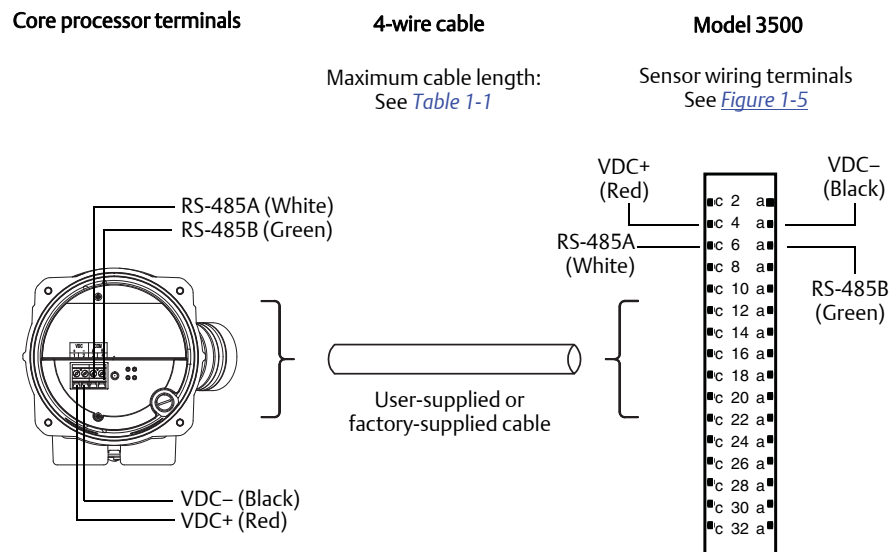
See [Table 3-2](#) and [Figure 3-2](#) (standard core processor) or [Figure 3-3](#) (enhanced core processor).

- 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

Terminal	Wire color ⁽¹⁾	Function
c 4	Red	VDC+
a 4	Black	VDC-
c 6	White	RS-485A
a 6	Green	RS-485B

(1) Wire colors apply to only 4-wire cable supplied by Micro Motion.

Figure 3-2: 4-wire cable to Model 3500 standard and remote core processors**Figure 3-3: 4-wire cable to Model 3500 for enhanced and remote enhanced core processors**

3.2.3

Wiring instructions for remote core processor with remote transmitter installations

There are two phases to this procedure:

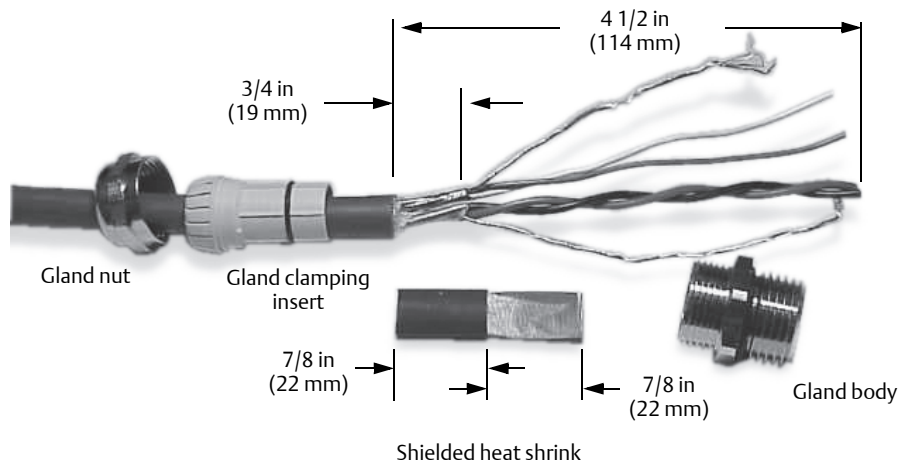
- Wiring the remote core processor to the transmitter
- Wiring the sensor to the remote core processor

To wire the remote core processor to the transmitter:

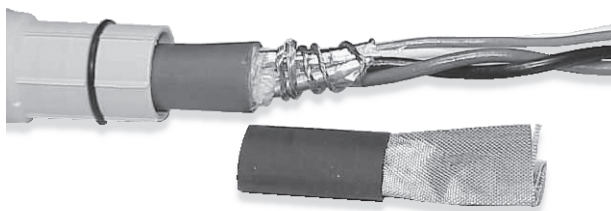
1. Use one of the following methods to shield the wiring.

Installation method	Procedure
Unshielded wiring in continuous metallic conduit that provides 360° termination shielding for the enclosed wiring	Go to Step 8
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	Go to Step 8
A Micro Motion-supplied cable gland at the core processor housing	Go to Step 2

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](#).

Figure 3-4: Gland nut and clamping insert

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.

Figure 3-5: Shield drain wires wrapped twice around exposed shield foil

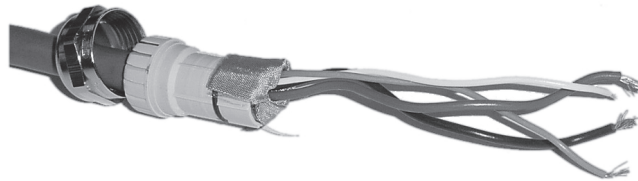
- e. Place the shielded heat shrink over the exposed shield drain wires. The tubing should completely cover the drain wires.
- f. Without burning the cable, apply heat (250 °F or 120 °C) to shrink the tubing. See [Figure 3-6](#).

Figure 3-6: Shielded heat shrink covering exposed drain wires



- 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](#).

Figure 3-7: Folded cloth

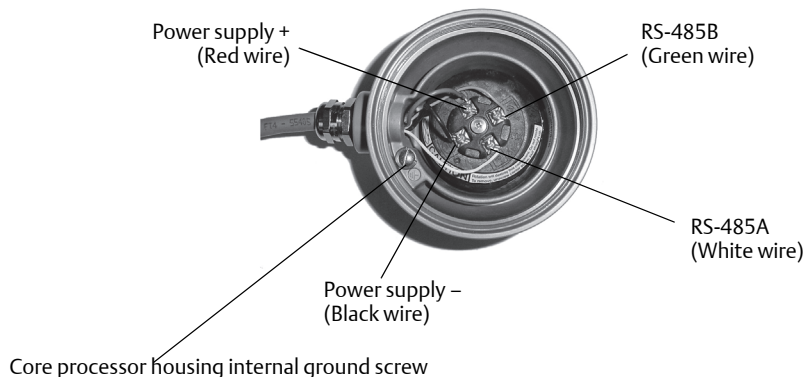


- i. Install the gland body into the core processor housing conduit opening. See [Figure 3-8](#).

Figure 3-8: Installing the gland body



- 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](#).

Figure 3-9: Connect the four wires to the numbered slots

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!

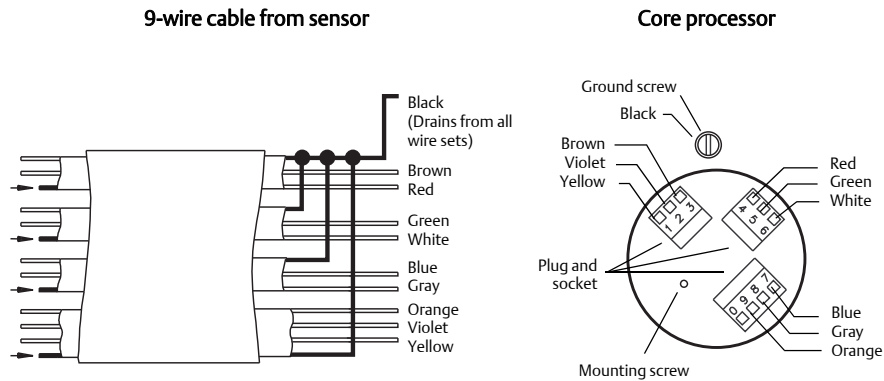
Do not allow the shield drain wires to contact the sensor junction box, as this can cause meter errors.

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*.

Figure 3-10: 9-wire cable between sensor and core processor



3. Ground the cable.

Cable type	Procedure
Jacketed cable	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.
Shielded or armored cable	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.

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

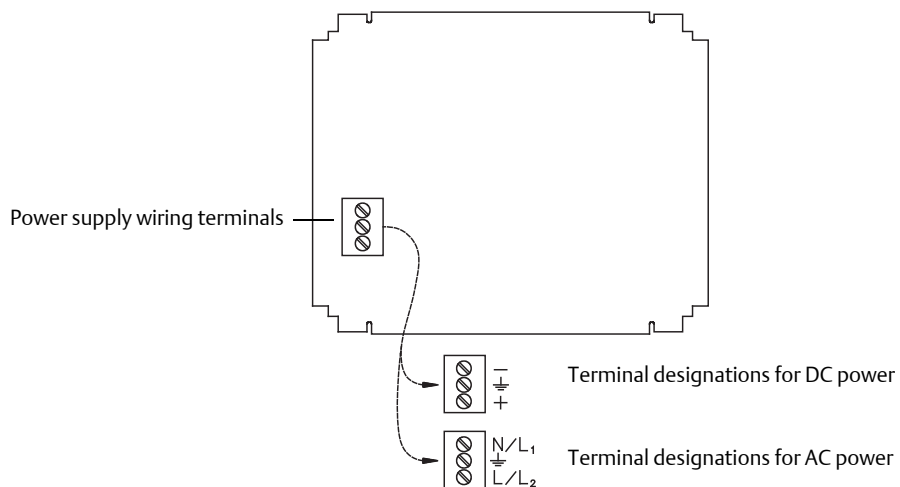
⚠ CAUTION!

- 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





20000993
Rev BA
2015

Micro Motion Inc. USA

Worldwide Headquarters
7070 Winchester Circle
Boulder, Colorado 80301
T +1 303-527-5200
T +1 800-522-6277
F +1 303-530-8459
www.micromotion.com

Micro Motion Europe

Emerson Process Management
Neonstraat 1
6718 WX Ede
The Netherlands
T +31 (0) 318 495 555
F +31 (0) 318 495 556
www.micromotion.nl

Micro Motion Asia

Emerson Process Management
1 Pandan Crescent
Singapore 128461
Republic of Singapore
T +65 6777-8211
F +65 6770-8003

Micro Motion United Kingdom

Emerson Process Management Limited
Horsfield Way
Bredbury Industrial Estate
Stockport SK6 2SU U.K.
T +44 0870 240 1978
F +44 0800 966 181

Micro Motion Japan

Emerson Process Management
1-2-5, Higashi Shinagawa
Shinagawa-ku
Tokyo 140-0002 Japan
T +81 3 5769-6803
F +81 3 5769-6844

©2015 Micro Motion, Inc. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. Micro Motion, ELITE, ProLink, MVD and MVD Direct Connect marks are marks of one of the Emerson Process Management family of companies. All other marks are property of their respective owners.

