

**Instruction Manual**

P/N 1004398, Rev. H

March 2005

# **Micro Motion<sup>®</sup> 9-Wire Flowmeter Cable Preparation and Installation**

Installation Manual





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# Chapter 1

## Before You Begin

### 1.1 Overview

This manual should be used for any Micro Motion flowmeter installation that requires 9-wire cable. The manual provides information for the following tasks:

- Planning the installation
- Selecting the 9-wire cable type
- Preparing the 9-wire cable for installation
- Installing conduit or cable glands
- Connecting the cable to the sensor
- Connecting the cable to the transmitter or core processor

*Note: This manual provides only information associated with installation of a 9-wire cable. For complete information on flowmeter installation, see the documentation provided with your sensor and transmitter.*

### 1.2 Safety

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

#### **WARNING**

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

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

#### **WARNING**

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

Make sure power is disconnected before installing transmitter.

## Before You Begin

### CAUTION

**Improper installation could cause measurement error or flowmeter failure.**

Follow all instructions to ensure transmitter will operate correctly.

### 1.3 Cable preparation kits

Two cable preparation kits are available from Micro Motion. These kits can be used with all cable and transmitter types. Contents of the cable preparation kits are listed in Table 1-1.

**Table 1-1 Cable preparation kits**

Kit #	Contents			
	Part number	Description	Size	Quantity
1004472	0213833	Heat-shrink tubing	Ø.125 x 3"	1
	0213834	Heat-shrink tubing	Ø.5 x 1.5"	2
0612001	0213833	Heat-shrink tubing	Ø.125 x 3"	1
	0213834	Heat-shrink tubing	Ø.5 x 1.5"	2
	0401103	Flat washer	M4	1
	0612101	Flat screw	M2.5 x 12	1
	0603101	Jam nut	M4	1
	0611901	Cable clamp	5/16"	1
	0611902	Cable clamp	3/8"	1

### 1.4 Terminology

In this manual, the term “MVD” applies to all flowmeter installations that include a core processor. The following transmitters require a core processor:

- Model 3500/3700 4-wire (MVD)
- Model 1500/2500
- Model 1700/2700

### 1.5 Installation architectures

Information in this manual applies only to installation of the 9-wire cable between a Micro Motion sensor and transmitter. 9-wire cable installation is required for the following installation architectures:

- MVD 9-wire remote installations
- Installation of the 9-wire cable (sensor to core processor) in remote core processor with remote transmitter installations
- 9-wire remote installations

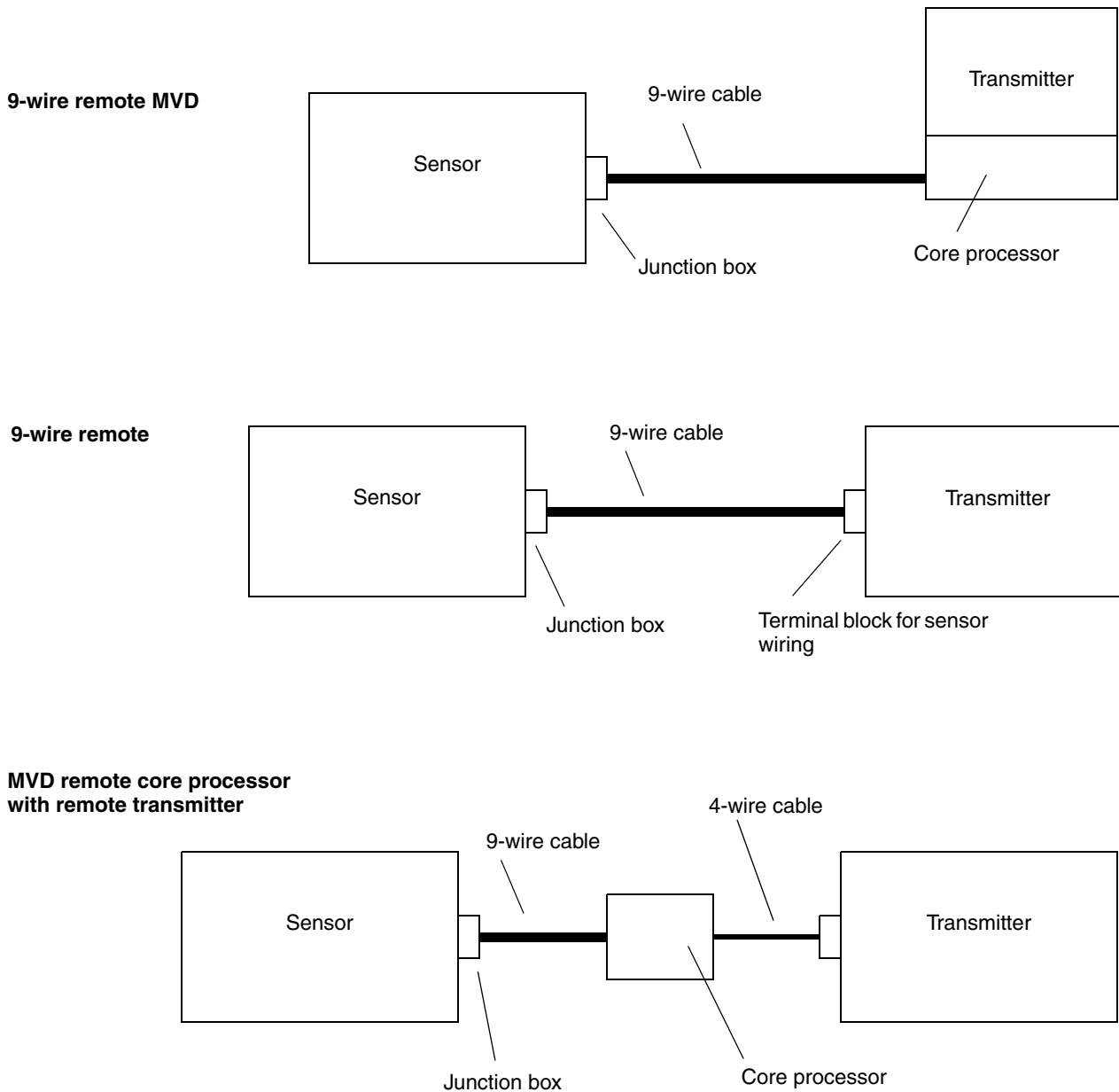
See Figure 1-1 for illustrations of these installation architectures. For more specific illustrations of your sensor and transmitter, refer to the documentation shipped with the product.

## Before You Begin

Information in this manual *does not* apply to the following:

- Integral installations
- 4-wire remote installations
- Installation of the 4-wire cable (core processor to transmitter) in remote core processor with remote transmitter installations

**Figure 1-1 Installation architectures**







# Chapter 2

## Planning the Installation

### 2.1 Overview

This chapter provides the following information:

- Hazardous area requirements
- Cable length requirements
- Cable location and connection requirements
- Cable types and requirements

*Note: Information in this chapter applies only to installation of the 9-wire cable. For other installation requirements, see the documentation provided with the sensor and transmitter.*

### 2.2 Hazardous area requirements

If the cable will be installed in a hazardous area, ensure that it meets the hazardous area requirements.

To comply with requirements for intrinsically safe (I.S.) installations, you must use this manual in conjunction with the appropriate approvals documentation. These manuals are shipped with the flowmeter or available on the Micro Motion web site: [www.micromotion.com](http://www.micromotion.com).

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

#### WARNING

**Failure to maintain intrinsic safety in a hazardous area could result in an explosion.**

To keep sensor wiring intrinsically safe:

- Keep intrinsically safe (I.S.) sensor wiring separated from power supply wiring and output wiring.
- Do not install power cable in the same conduit or cable tray as flowmeter cable.
- Use this document with the appropriate approvals documentation.
- For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

## Planning the Installation

### 2.3 Cable length requirements

The maximum length of a 9-wire cable in a Micro Motion flowmeter installation depends on the transmitter type. See Table 2-1.

**Table 2-1 Transmitter types and maximum cable length**

Transmitter type	Maximum length of 9-wire cable
Model 1500/2500 Model 1700/2700 Model 3500/3700 4-wire (MVD)	60 feet (20 meters)
RFT9739 IFT9701 Model 3500/3700 9-wire	1000 feet (300 meters)

### 2.4 Cable location and connection requirements

Cable location and connection requirements are as follows:

- Keep cable away from all devices that produce large electromagnetic fields, e.g., transformers, motors, and power lines.
- Orient cable openings at the sensor junction box and the transmitter in a way that minimizes condensation or moisture in the junction box and transmitter housing.
- Do not install 9-wire flowmeter cable and power cable in the same conduit or cable tray.

**⚠ CAUTION**

**Improper installation of cable, cable gland, or conduit could cause inaccurate measurements or flowmeter failure.**

Keep cable away from devices such as transformers, motors, and power lines, which generate large electromagnetic fields.

Do not install 9-wire flowmeter cable and power cable in the same conduit or cable tray.

### 2.5 Cable types

Micro Motion supplies three types of 9-wire cable: jacketed, shielded, and armored. Note the following differences between cable types:

- Armored cable provides mechanical protection for the cable wires.
- Jacketed cable has a smaller bend radius than shielded or armored cable.
- If ATEX compliance is required, the different cable types have different installation requirements.
- All cable types can be ordered with either a PVC or a Teflon® FEP jacket.

Use the information in this section to ensure that your cable is appropriate for your installation.

### 2.5.1 T-Series requirements

For T-Series sensors, either shielded or armored cable with a Teflon FEP jacket is required.

### 2.5.2 Factory-supplied cable

Cable is automatically shipped with certain transmitter orders:

- IFT9701 transmitters ordered with either the R or L mounting option are shipped with Teflon FEP shielded cable attached to the transmitter.
- Model 1500/2500 transmitters ordered with the B mounting option are shipped with 10 feet of Teflon FEP shielded cable.
- Model 1700/2700 transmitters ordered with either the B or C mounting option are shipped with 10 feet of Teflon FEP shielded cable.
- RFT9739 transmitters are shipped with 10 feet of PVC jacketed cable.

### 2.5.3 ATEX compliance

To comply with ATEX requirements:

- If you are using jacketed cable, the cable must be properly installed inside user-supplied sealed metallic conduit that provides 360° termination shielding for the enclosed cable. For instructions on cable installation in conduit, see Chapter 3.
- If you are using shielded or armored cable, the cable must be properly installed with cable glands ordered from Micro Motion. For instructions on cable installation with cable glands, see Chapter 4.

### 2.5.4 Jacket types

All cable types can be ordered with either a PVC or a Teflon FEP jacket. Teflon FEP is required for the following installation types:

- All installations that include a T-Series sensor
- All installations that include an MVD transmitter or core processor
- All installations with a cable length of 250 feet (75 m) or greater, with nominal flow less than 20% and ambient temperature changes greater than 68 °F (20 °C).

The jacket type affects the bend radius of the cable. See Figures 2-1, 2-2, and 2-3.

For temperature ranges of cable jacket materials, see Table 2-2.

#### CAUTION

**Failure to use metallic conduit or shielded or armored cable when installing Micro Motion sensors could cause inaccurate measurements.**

## Planning the Installation

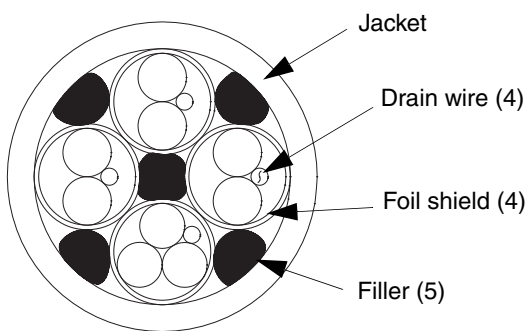
**Table 2-2 Cable jacket material and temperature ranges**

Cable jacket material	Handling temperature		Operating temperature	
	Low limit	High limit	Low limit	High limit
PVC	-4 °F (-20 °C)	194 °F (90 °C)	-40 °F (-40 °C)	221 °F (105 °C)
Teflon® FEP <sup>(1)</sup>	-40 °F (-40 °C)	194 °F (90 °C)	-76 °F (-60 °C)	302 °F (150 °C)

(1) Teflon FEP is required for all T-Series sensors and all MVD installations.

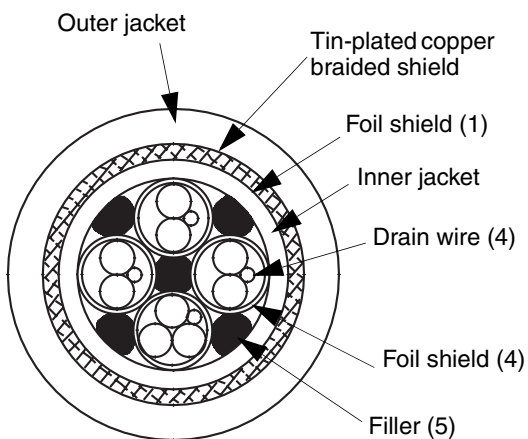
### 2.5.5 Cable illustrations and bend radii

**Figure 2-1 Jacketed cable**



Jacket material	Outside diameter <i>inches (mm)</i>	Minimum bend radii	
		Static (no load) condition <i>inches (mm)</i>	Under dynamic load <i>inches (mm)</i>
PVC	0.415 (10)	3 1/8 (80)	6 1/4 (159)
Teflon FEP	0.340 (9)	2 5/8 (67)	5 1/8 (131)

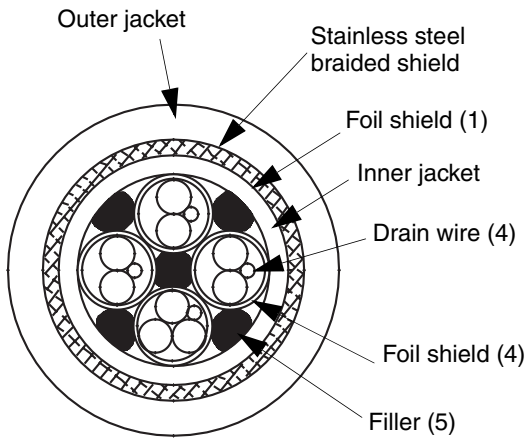
**Figure 2-2 Shielded cable**



Jacket material	Outside diameter <i>inches (mm)</i>	Minimum bend radii	
		Static (no load) condition <i>inches (mm)</i>	Under dynamic load <i>inches (mm)</i>
PVC	0.525 (14)	4 1/4 (108)	8 1/2 (216)
Teflon FEP	0.425 (11)	3 1/4 (83)	6 3/8 (162)

## Planning the Installation

**Figure 2-3 Armored cable**



Jacket material	Outside diameter <i>inches (mm)</i>	Minimum bend radii	
		Static (no load) condition <i>inches (mm)</i>	Under dynamic load <i>inches (mm)</i>
PVC	0.525 (14)	4 1/4 (108)	8 1/2 (216)
Teflon FEP	0.425 (11)	3 1/4 (83)	6 3/8 (162)



# Chapter 3

## Installing Jacketed Cable in Conduit

### 3.1 Overview

This chapter provides the following information:

- Installation steps for installing cable in conduit
- Preparing jacketed cable for installation in conduit

#### **⚠ CAUTION**

**Improper installation of cable or conduit could cause inaccurate measurements or flowmeter failure.**

Install user-supplied conduit connectors in the 9-wire conduit opening in the transmitter housing and the sensor junction box. Ensure that the cable drain wires do not make contact with the junction box or the transmitter housing.

### 3.2 Requirements

To comply with ATEX requirements, jacketed cable must be installed in conduit. The conduit must be sealed metallic conduit that provides 360° termination shielding for the enclosed cable. If mechanical protection is required, install explosion-proof (flameproof) conduit.

*Note: Conduit can be used with jacketed, shielded, or armored cable. Jacketed cable is most typical.*

### 3.3 Installation steps

1. Install drip legs in conduit.
2. Run the cable through the conduit. Do not install 9-wire cable and power cable in the same conduit.
3. Some Micro Motion transmitters are supplied with one or more conduit seals, which are used to seal unused conduit openings. If required, assemble conduit seals according to instructions and install them in the appropriate conduit openings.
4. To prevent conduit connectors from seizing in the threads of the conduit openings, apply a conductive anti-galling compound to the threads, or wrap threads with PTFE tape two to three layers deep. Wrap the tape in the direction opposite to the direction in which the male threads will turn when inserted into the female conduit opening.
5. At both the sensor and the transmitter (or core processor), connect a male conduit connector and waterproof seal to the conduit opening for 9-wire cable.

## Installing Jacketed Cable in Conduit

6. At the sensor:
  - a. Open the junction-box cover.
  - b. Pass the cable through the conduit opening for 9-wire cable.
  - c. Prepare the cable as described in Section 3.4.1.
  - d. Identify sensor terminals by color. See Figure A-1 for diagrams of sensor terminal blocks.
  - e. Insert the stripped end of each wire into the corresponding terminal in the junction box, matching by color. No bare wire should remain exposed.
  - f. Tighten the screws to hold the wires in place.
  - g. Ensure integrity of gaskets, grease all O-rings, then close the junction-box cover and tighten all screws.
7. If you are connecting to a core processor (MVD transmitters):
  - a. Remove the core processor end-cap. See Figure A-2.
  - b. Pass the cable through the conduit opening for 9-wire cable. See Figure A-2.
  - c. Prepare the cable as described in Section 3.4.2.
  - d. Identify the wires by color.
  - e. Connect the wires to the plugs supplied with the core processor, matching by color as shown in Figure A-3.
  - f. Insert the plugs into the sockets inside the 9-wire conduit ring.
  - g. Ground the drain wires to the ground screw inside the 9-wire conduit ring. Never ground to the core processor's mounting screw.
  - h. Tighten the screws to hold the wires in place.
  - i. Ensure integrity of gaskets, grease all O-rings, then close the core processor end-cap and tighten all screws.
8. If you are connecting to an RFT9739, IFT9701, or Model 3500/3700 9-wire transmitter:
  - a. Pass the cable through the conduit opening for 9-wire cable in the transmitter housing (where applicable).
  - b. Prepare the cable as described in Section 3.4.2.
  - c. Refer to Figure A-4 or Figure A-5 to identify the terminals on your transmitter.

*Note: To locate the sensor wiring terminal compartment on your transmitter, see the transmitter documentation.*

- d. Identify the wires by color.
- e. Insert the stripped end of each wire into the corresponding terminal in the transmitter terminal block, matching by color. No bare wire should remain exposed.
- f. Ground the drain wires to the designated terminal on the transmitter.
- g. Tighten the screws to hold the wires in place.
- h. Ensure integrity of gaskets, then close the wiring compartment and tighten all screws (where applicable).



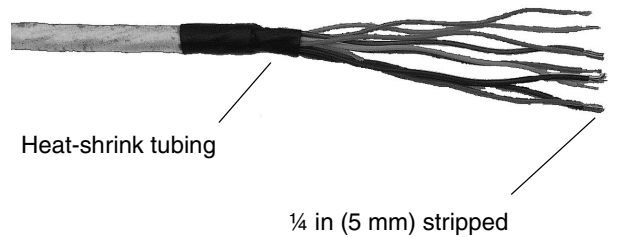
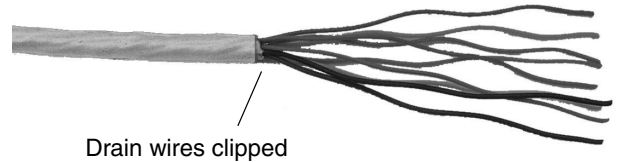
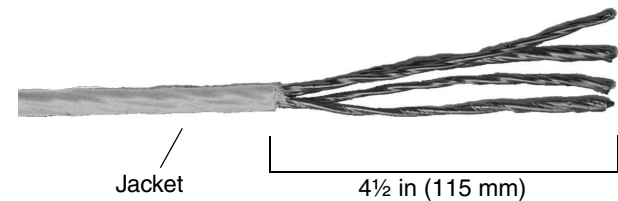
### 3.4 Preparing jacketed cable for installation in conduit

For cable preparation at the sensor end, see Section 3.4.1.

For cable preparation at the transmitter end, see Section 3.4.2.

#### 3.4.1 Preparing jacketed cable at the sensor end

1. Strip 4½ inches (115 mm) of cable jacket.
2. Remove the clear wrap that is inside the cable jacket, and remove the filler material between the wires.
3. Remove the foil that is around the insulated wires and separate them.
4. Identify the drain wires in the cable. Clip off each drain wire as close as possible to the cable jacket.
5. Slide the 1½-inch (40 mm) long heat-shrink tubing over the wires and cable jacket. The tubing should completely cover the clipped ends of the drain wires.
6. Without burning the cable, apply heat to shrink the tubing. Recommended temperature is 250 °F (121 °C).
7. Allow the cable to cool, then strip ¼ inch (5 mm) of insulation from each wire.

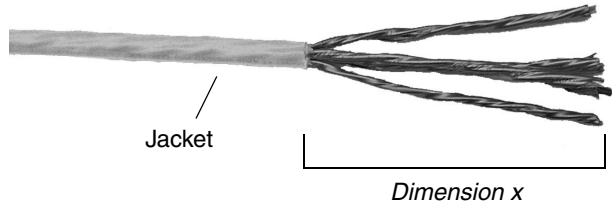


## Installing Jacketed Cable in Conduit

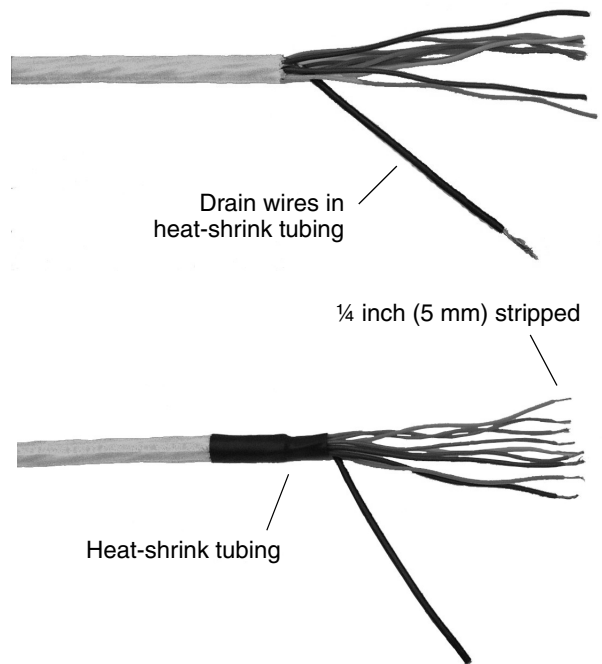
### 3.4.2 Preparing jacketed cable at the transmitter end

- Strip *Dimension x* of the cable jacket as specified below.

Transmitter	Dimension x
All MVD	4½ in (115 mm)
RFT9739 field-mount IFT9701 Model 3700 9-wire	4 in (100 mm)
RFT9739 rack-mount Model 3500 9-wire	3 in (75 mm)



- Remove the clear wrap that is inside the cable jacket, and remove the filler material between the wires.
- Remove the foil that is around the insulated wires and separate them.
- Identify the drain wires in the cable. Bring the drain wires together. Fan the other wires to the outside of the cable. Twist the drain wires together.
- Slide the 3-inch (75 mm) long heat-shrink tubing over the drain wires. Push the tubing as close as possible to the cable jacket.
- Slide the 1½-inch (40 mm) long heat-shrink tubing over the cable jacket. The tubing should completely cover all portions of the drain wires that remain exposed next to the cable jacket.
- Without burning the cable, apply heat to shrink all tubing. Recommended temperature is 250 °F (121 °C).
- Allow the cable to cool, then strip ¼ inch (5 mm) of insulation from each wire.



# Chapter 4

## Installing Shielded or Armored Cable with Cable Glands

### 4.1 Overview

This chapter provides the following information:

- Installation steps for installing shielded or armored cable with cable glands
- Preparing shielded or armored cable for installation with cable glands

#### CAUTION

**Improper installation of cable or cable glands could cause inaccurate measurements or flowmeter failure.**

Install cable glands in the 9-wire conduit opening in the transmitter housing and the sensor junction box. Ensure that the cable drain wires and shields do not make contact with the junction box or the transmitter housing.

### 4.2 Requirements

To comply with ATEX requirements, shielded or armored cable must be installed with cable glands. Cable glands that meet ATEX requirements can be purchased from Micro Motion. Cable glands from other vendors can be used.

If you are connecting to an RFT9739 rack-mount transmitter or a Model 3500 transmitter, a cable gland is not installed at the transmitter. For these flowmeters, a cable gland is installed only at the sensor. For all other flowmeters, you must install one cable gland at the sensor, and another cable gland at the transmitter or core processor. Cable gland assembly is the same at both ends of the cable.

### 4.3 Cable gland components

A typical cable gland purchased from Micro Motion includes the following components:

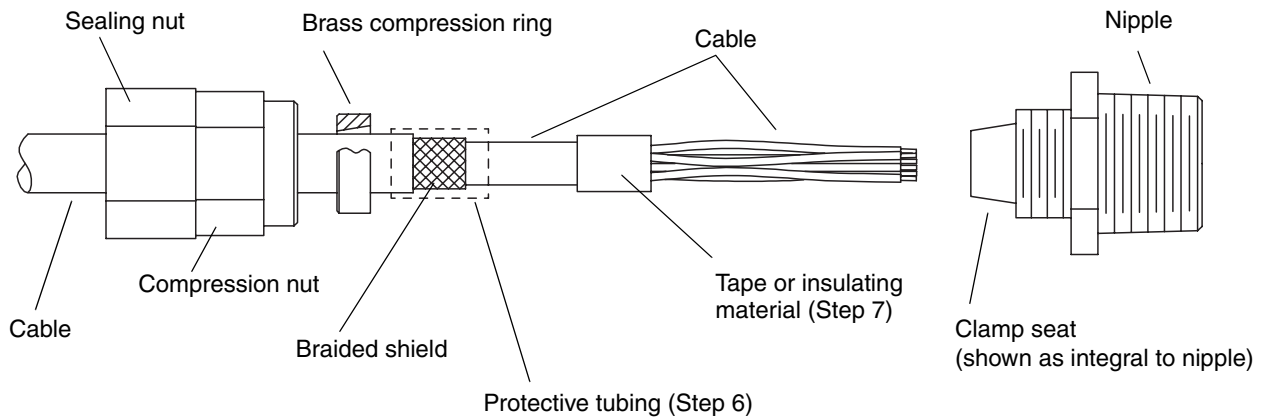
- Nipple
- Compression nut
- Tapered brass compression ring
- Sealing nut

## Installing Shielded or Armored Cable with Cable Glands

### 4.4 Installation steps for Micro Motion-supplied cable glands

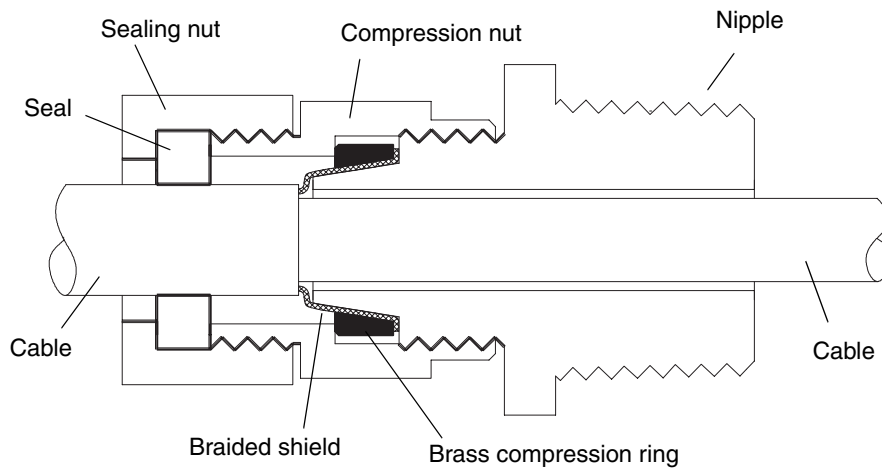
1. Install drip legs at conduit openings.
2. Identify the components shown in Figure 4-1.

**Figure 4-1 Cable gland and cable (exploded)**



3. Unscrew the nipple from the compression nut.
4. Screw the nipple into the conduit opening for 9-wire cable. Tighten it to one turn past hand-tight.
5. Slide the compression ring, compression nut, and sealing nut onto the cable. Make sure the compression ring is oriented so the taper will mate properly with the tapered end of the nipple.
6. If the cable was shipped with protective tubing over the shield, remove the tubing.
7. Cover exposed foil with one wrap of plastic electrical tape or other suitable insulation material.
8. Remove the junction-box cover and core processor end-cap (see Figure A-2), or transmitter wiring compartment cover and plastic barrier divider (if applicable).
9. Pass the cable end through the nipple so the braided shield slides over the tapered end of the nipple.
10. If the cable was not prepared at the factory, prepare it as described in Section 4.6.
11. Slide the compression ring over the braided shield.
12. Screw the compression nut onto the nipple. Tighten the sealing nut and compression nut by hand to ensure that the compression ring traps the braided shield.
13. Use a 25-mm (1-inch) wrench to tighten sealing nut and compression nut to 20–25 foot-pounds (27–34 N-m) of torque. See Figure 4-2 for an illustration of a complete cable gland assembly.

Figure 4-2 Cross-section of assembled cable gland with cable



14. At the sensor:
  - a. Identify the terminals by color. See Figure A-1 for diagrams of sensor terminal blocks.
  - b. Insert the stripped end of each wire into the corresponding terminal in the junction box, matching by color. No bare wire should remain exposed.
  - c. Tighten the screws to hold the wires in place.
  - d. Ensure integrity of gaskets, grease all O-rings, then close the junction-box cover and tighten all screws.
15. If you are connecting to a core processor (MVD transmitters):
  - a. Identify the wires by color.
  - b. Connect the wires to the plugs supplied with the core processor, matching by color as shown in Figure A-3.
  - c. Insert the plugs into the sockets inside the 9-wire conduit ring.
  - d. Ground the drain wires to the ground screw inside the 9-wire conduit ring. Never ground to the core processor's mounting screw.
  - e. Tighten the screws to hold the wires in place.
  - f. Ensure integrity of gaskets, grease all O-rings, then close the core processor end-cap.
16. If you are connecting to a Model 3700 9-wire, RFT9739 field-mount, or IFT9701 transmitter:
  - a. See Figure A-4 to identify the terminals on your transmitter.

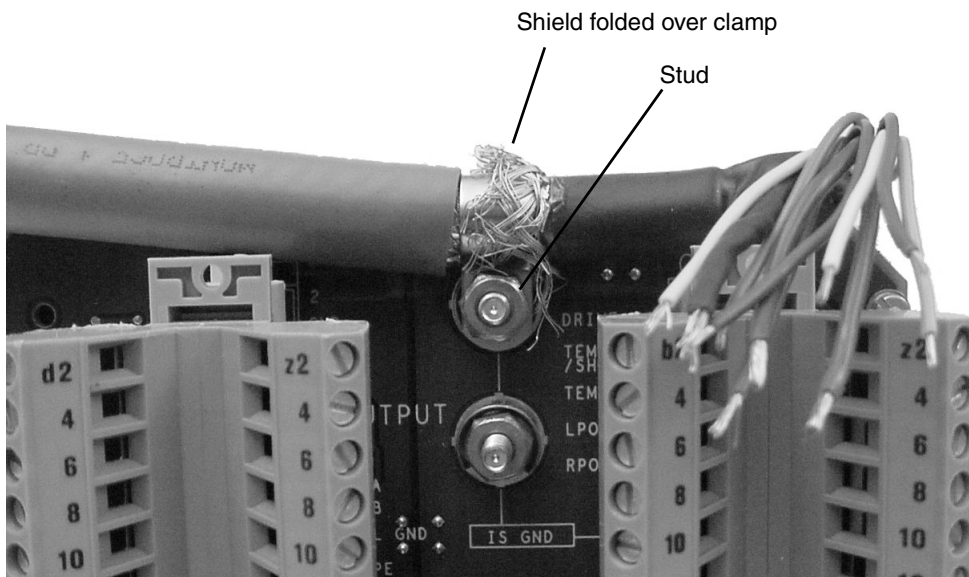
*Note: To locate the sensor wiring terminal compartment on your transmitter, see the transmitter documentation.*

- b. Identify the wires by color.
- c. Insert the stripped end of each wire into the corresponding terminal in the transmitter terminal block, matching by color. No bare wire should remain exposed.
- d. Ground the drain wires to the designated terminal on the transmitter.
- e. Tighten the screws to hold the wires in place.
- f. If applicable, reinstall the plastic barrier divider.
- g. Ensure integrity of gaskets, then close the wiring compartment, and tighten all screws.

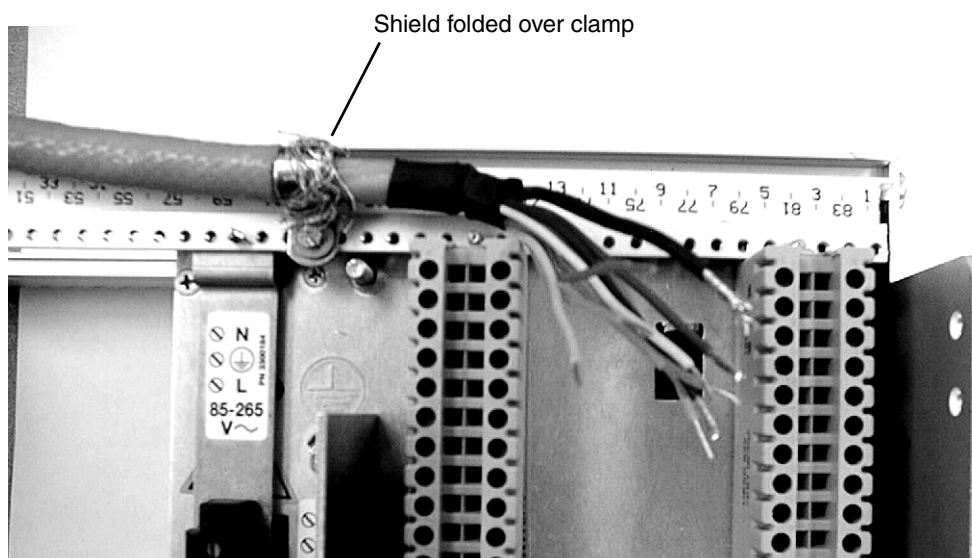
## Installing Shielded or Armored Cable with Cable Glands

17. If you are connecting to an RFT9739 rack-mount or Model 3500 9-wire (rack-mount or panel-mount) transmitter:
  - a. Fold the shield back over the cable clamp.
  - b. For RFT9739 rack-mount transmitters, connect the cable clamp to the stud (see Figure 4-3), using the supplied M4 nut and washer.
  - c. For Model 3500 rack-mount transmitters, connect the cable clamp to the rack (see Figure 4-4), using the supplied M2.5 screw.
  - d. For Model 3500 panel-mount transmitters, connect the cable clamp to the stud (see Figure 4-5), using the supplied M4 nut and washer.

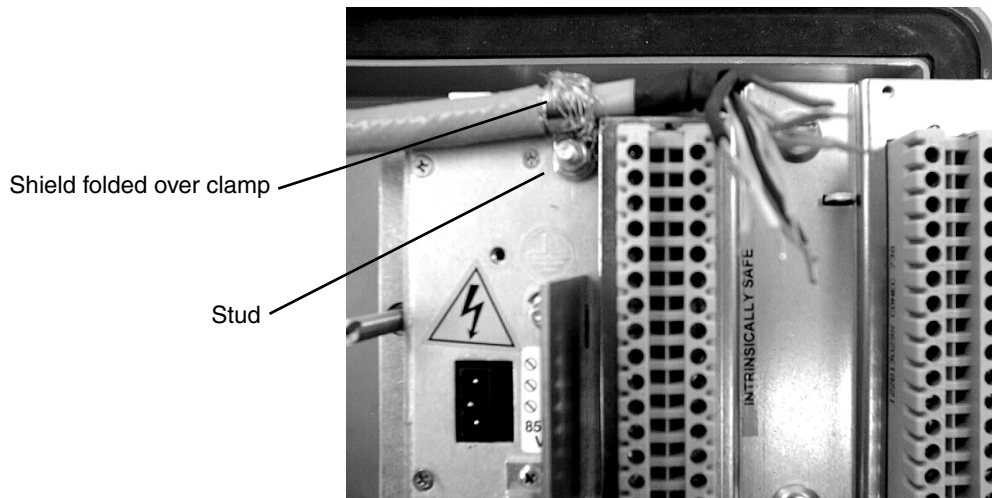
**Figure 4-3 Clamping to an RFT9739 rack-mount transmitter**



**Figure 4-4 Clamping to a Model 3500 rack-mount transmitter**



**Figure 4-5 Clamping to a Model 3500 panel-mount transmitter**



- e. See Figure A-5 to identify the terminals on your transmitter.

*Note: To locate the sensor wiring terminal compartment on your transmitter, see the transmitter documentation.*

- f. Identify the wires by color.
- g. Insert the stripped end of each wire into the corresponding terminal in the transmitter terminal block, matching by color. No bare wire should remain exposed.
- h. Twist the drain wires together, and ground the drain wires to the designated terminal on the transmitter.
- i. Tighten the screws to hold the wires in place.

### 4.5 Installation steps for other cable glands

1. Assemble and install the cable glands according to the vendor instructions. For best results, use the instructions provided for Micro Motion cable glands (Section 4.4) for reference and comparison. Be sure to ground the cable braid in the cable gland at both ends.
2. Connect the cable to the sensor and transmitter (or core processor) as described in the instructions provided for Micro Motion cable glands (Steps 14–17).

## Installing Shielded or Armored Cable with Cable Glands

### 4.6 Preparing shielded or armored cable for installation with cable glands

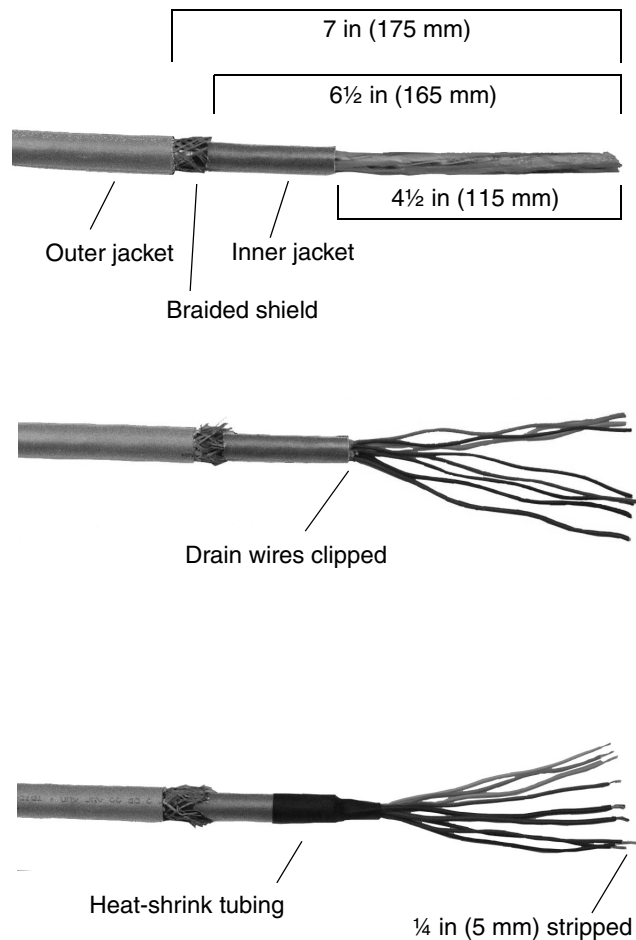
For cable preparation at the sensor end, see Section 4.6.1.

For cable preparation at the transmitter end:

- For all MVD transmitters, and RFT9739 field-mount, Model 3700 9-wire, and IFT9701 transmitters, see Section 4.6.2.
- For RFT9739 rack-mount and Model 3500 9-wire transmitters, see Section 4.6.3.

#### 4.6.1 Preparing shielded or armored cable at the sensor end

1. Without cutting the shield, strip 7 inches (175 mm) of outer jacket.
2. Strip 6½ inches (165 mm) of braided shield, so ½ inch (10 mm) of shield remains exposed.
3. Remove the foil shield that is between the braided shield and inner jacket.
4. Strip 4½ inches (115 mm) of inner jacket.
5. Remove the clear wrap that is inside the inner jacket, and remove the filler material between the wires.
6. Remove the foil that is around the insulated wires and separate them.
7. Identify the drain wires in the cable. Clip off each drain wire as close as possible to the cable jacket.
8. Slide the 1½-inch (40 mm) long heat-shrink tubing over the inner jacket. The tubing should completely cover the clipped ends of the drain wires.
9. Without burning the cable, apply heat to shrink the tubing. Recommended temperature is 250 °F (121 °C).
10. Allow the cable to cool, then strip ¼ inch (5 mm) of insulation from each wire.

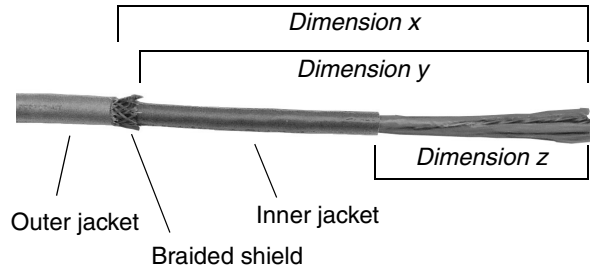




**4.6.2 Preparing shielded or armored cable for all MVD transmitters, and RFT9739 field-mount, Model 3700 9-wire, and IFT9701 transmitters**

- Without cutting the shield, strip *Dimension x* of outer jacket.

Transmitter	Dimension x
All MVD	7½ in (190 mm)
RFT9739 field-mount	9 in (225 mm)
Model 3700 9-wire	10 in (255 mm)
IFT9701	6¾ in (170 mm)



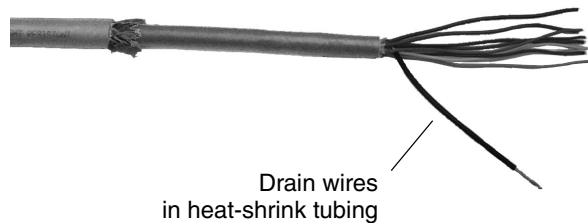
- Strip *Dimension y* of shield, so ½ inch (10 mm) of shield remains exposed.

Transmitter	Dimension y
All MVD	7 in (180 mm)
RFT9739 field-mount	8½ in (215 mm)
Model 3700 9-wire	9½ in (245 mm)
IFT9701	6¾ in (160 mm)

- Remove the foil shield that is between the braided shield and inner jacket.
- Strip *Dimension z* of inner jacket.

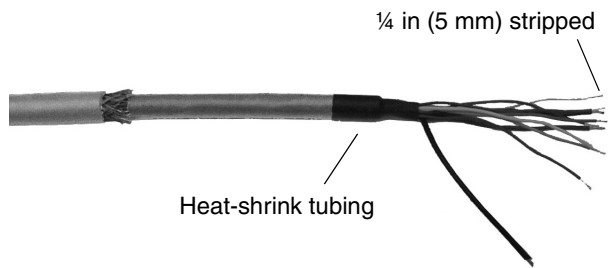
Transmitter	Dimension z
All MVD	4½ in (115 mm)
RFT9739 field-mount	4 in (100 mm)
Model 3700 9-wire	4 in (100 mm)
IFT9701	4 in (100 mm)

- Remove the clear wrap that is inside the cable inner jacket, and remove the filler material between the wires.
- Remove the foil that is around the insulated wires and separate them.
- Identify the drain wires in the cable. Bring the drain wires together. Fan the other wires to the outside of the cable. Twist the drain wires together.
- Slide the 3-inch (75 mm) long heat-shrink tubing over the drain wires. Push the tubing as close as possible to the inner jacket.



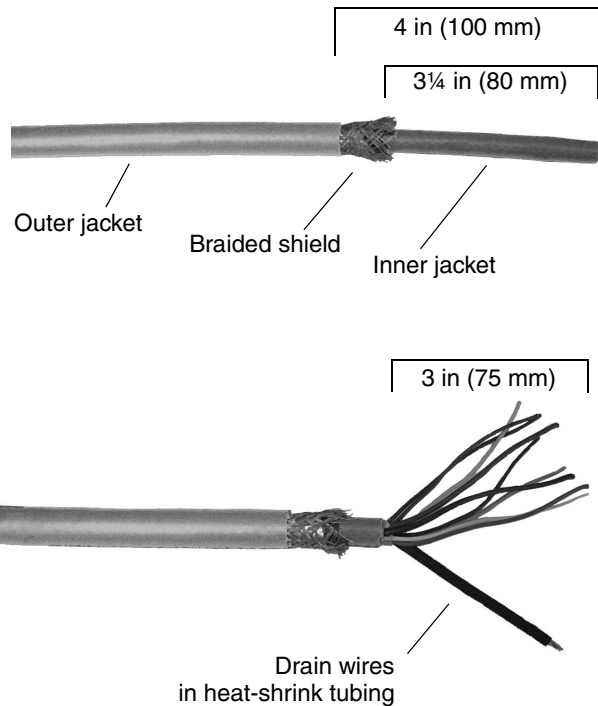
## Installing Shielded or Armored Cable with Cable Glands

- Slide the 1½-inch (40 mm) long heat-shrink tubing over the cable jacket. The tubing should completely cover all portions of the drain wires that remain exposed next to the cable jacket.
- Without burning the cable, apply heat to shrink all tubing. Recommended temperature is 250 °F (121 °C).
- Allow the cable to cool, then strip ¼ inch (5 mm) of insulation from each wire.



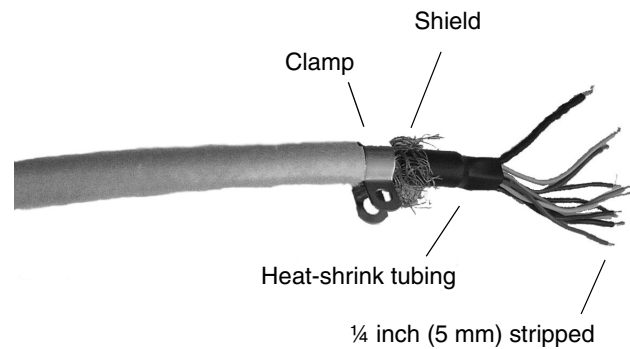
### 4.6.3 Preparing shielded or armored cable for RFT9739 rack-mount and Model 3500 9-wire transmitters

- Without cutting the shield, strip 4 inches (100 mm) of outer jacket.
- Strip ¾ inches (80 mm) of shield, so ¾ inch (20 mm) of shield remains exposed.
- Remove the foil shield that is between the braided shield and inner jacket.
- Strip 3 inches (75 mm) of inner jacket.
- Remove the clear wrap that is inside the cable inner jacket, and remove the filler material between the wires.
- Remove the foil that is around the insulated wires and separate them.
- Identify the drain wires in the cable. Bring the drain wires together. Fan the other wires to the outside of the cable. Twist the drain wires together.
- Remove a ¼-inch (5 mm) length from the 3-inch (75 mm) long heat-shrink tubing, then slide the tubing over the drain wires. Push the tubing as close as possible to the inner jacket.



## Installing Shielded or Armored Cable with Cable Glands

9. Slide the 1½-inch (40 mm) long heat-shrink tubing over the inner jacket. The tubing should completely cover all portions of the drain wires that remain exposed next to the inner jacket, but should not cover the shield.
10. Without burning the cable, apply heat to shrink all tubing. Recommended temperature is 250 °F (121 °C).
11. Allow the cable to cool, then strip ¼ inch (5 mm) of insulation from each wire.
12. Slide one of the supplied metal cable clamps over the braided shield.
  - Use the larger clamp if the cable jacket is PVC.
  - Use the smaller clamp if the cable jacket is FEP.
  - Make sure the clamp is oriented as shown.





# Appendix A

## Terminal Reference

### A.1 Overview

This appendix provides the following information:

- Cable wire colors and functions – see Section A.2
- Illustrations for:
  - Sensor terminal blocks – see Figure A-1
  - Core processor components (MVD transmitters) – see Figure A-2
  - Core processor terminals – see Figure A-3
  - RFT9739 and IFT9701 transmitter terminal blocks – see Figure A-4
  - Model 3500/3700 9-wire transmitter terminal blocks – see Figure A-5

#### CAUTION

**Improper installation of cable, cable gland, or conduit could cause inaccurate measurements or flowmeter failure.**

When connecting the cable to the sensor or transmitter terminals, ensure that the cable drain wires and shields do not make contact with the junction box or the transmitter housing.

### A.2 Cable wire colors and functions

Micro Motion 9-wire cable is color coded. Table A-1 lists the wire colors and functions for all 9-wire cable types.

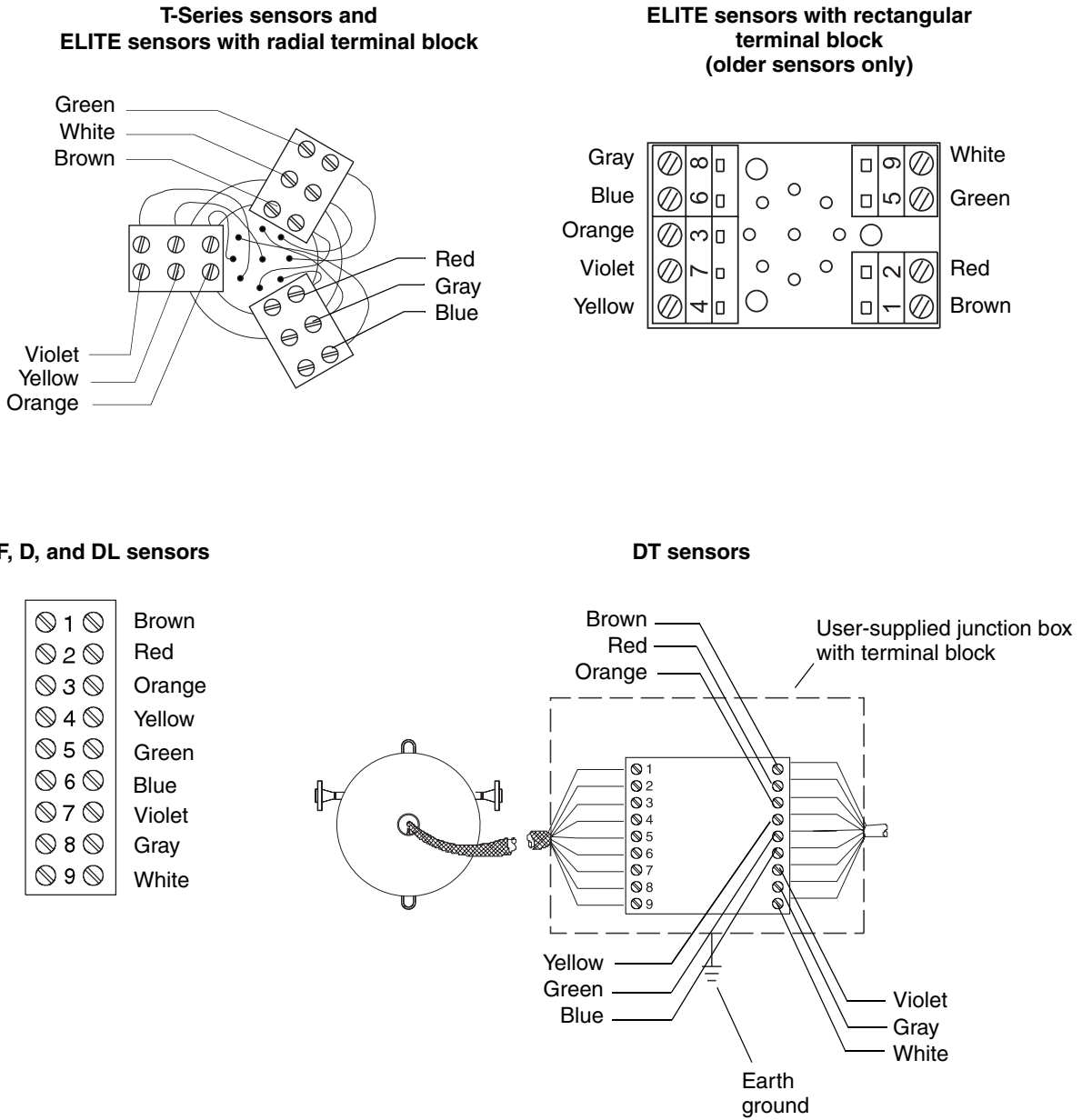
**Table A-1 9-wire cable wire colors and functions**

Wire Color	Function
Brown	Drive +
Red	Drive –
Orange	<ul style="list-style-type: none"> <li>• T-Series sensors (straight tube): Composite RTD</li> <li>• All other sensors (curved tube): Lead length compensator (LLC)</li> </ul>
Yellow	Temperature return
Green	Left pickoff +
Blue	Right pickoff +
Violet	Tube RTD
Gray	Right pickoff –
White	Left pickoff –
Black	Drain

Terminal Reference

A.3 Illustrations

Figure A-1 Sensor terminal blocks



*Note: If you are connecting a DT sensor to an MVD transmitter, using the pre-installed cable with no extension, the junction box is not required. If you are using additional cable, the junction box is strongly recommended.*

Figure A-2 Core processor components

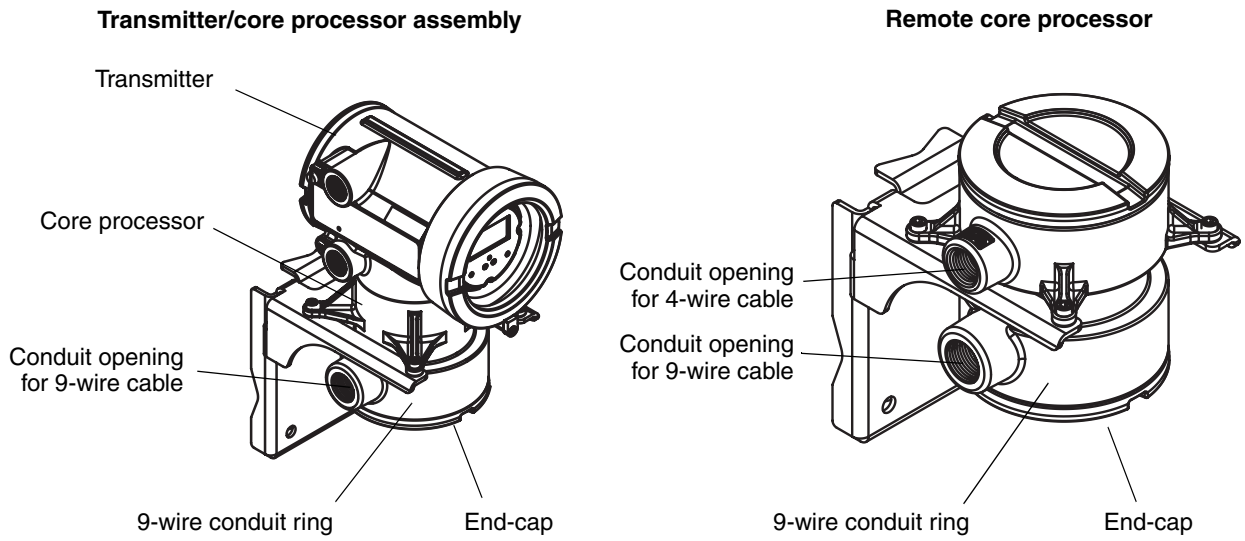
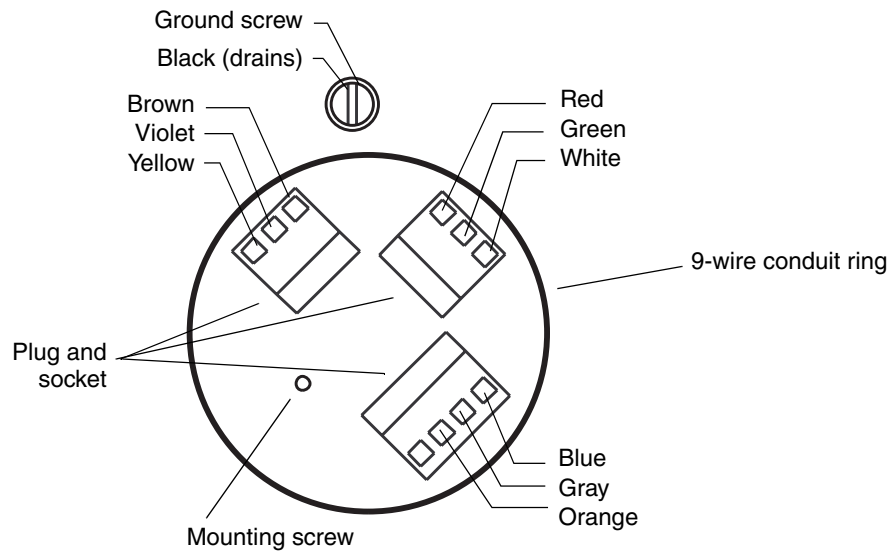
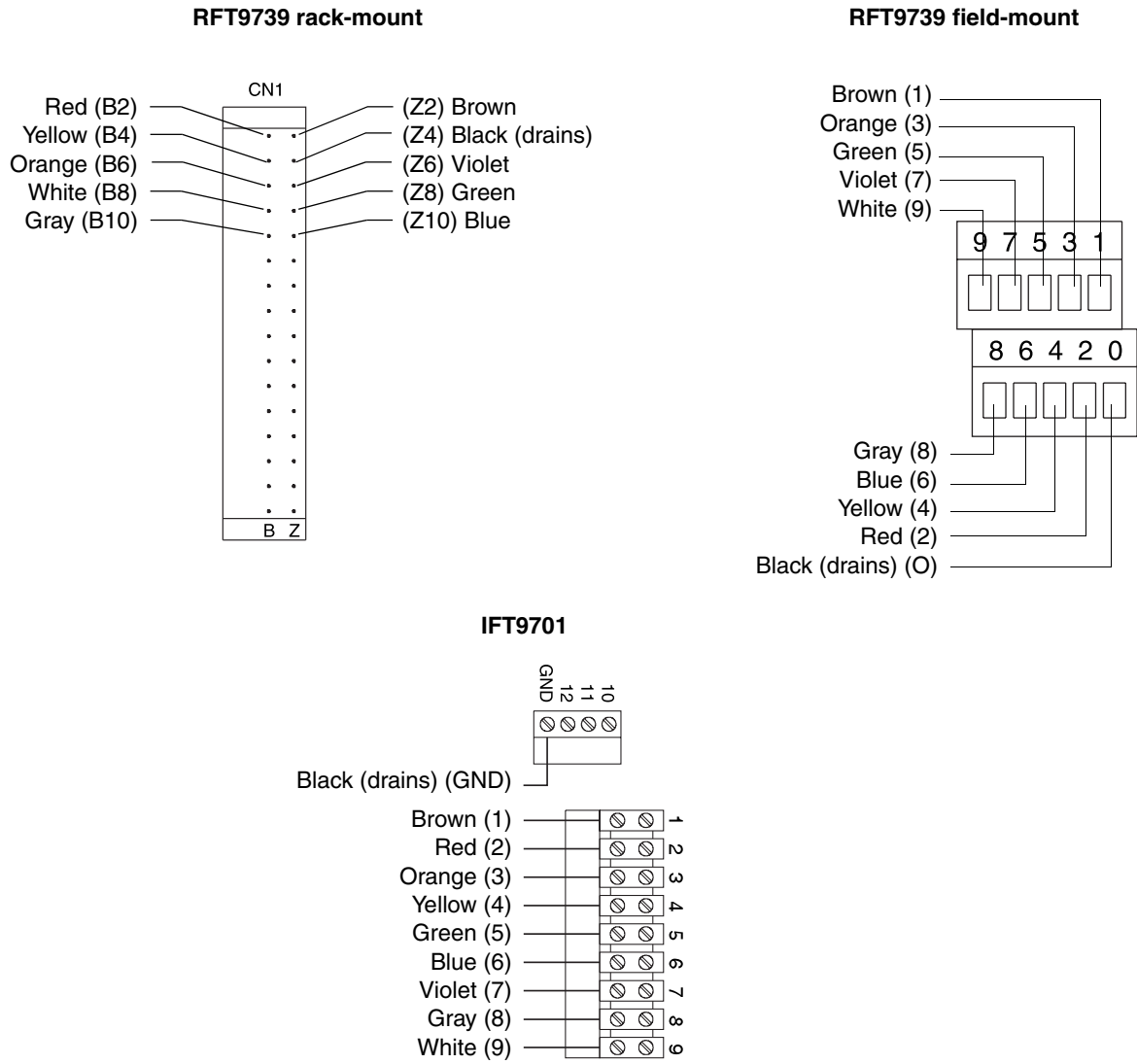


Figure A-3 Core processor terminals



**Terminal Reference**

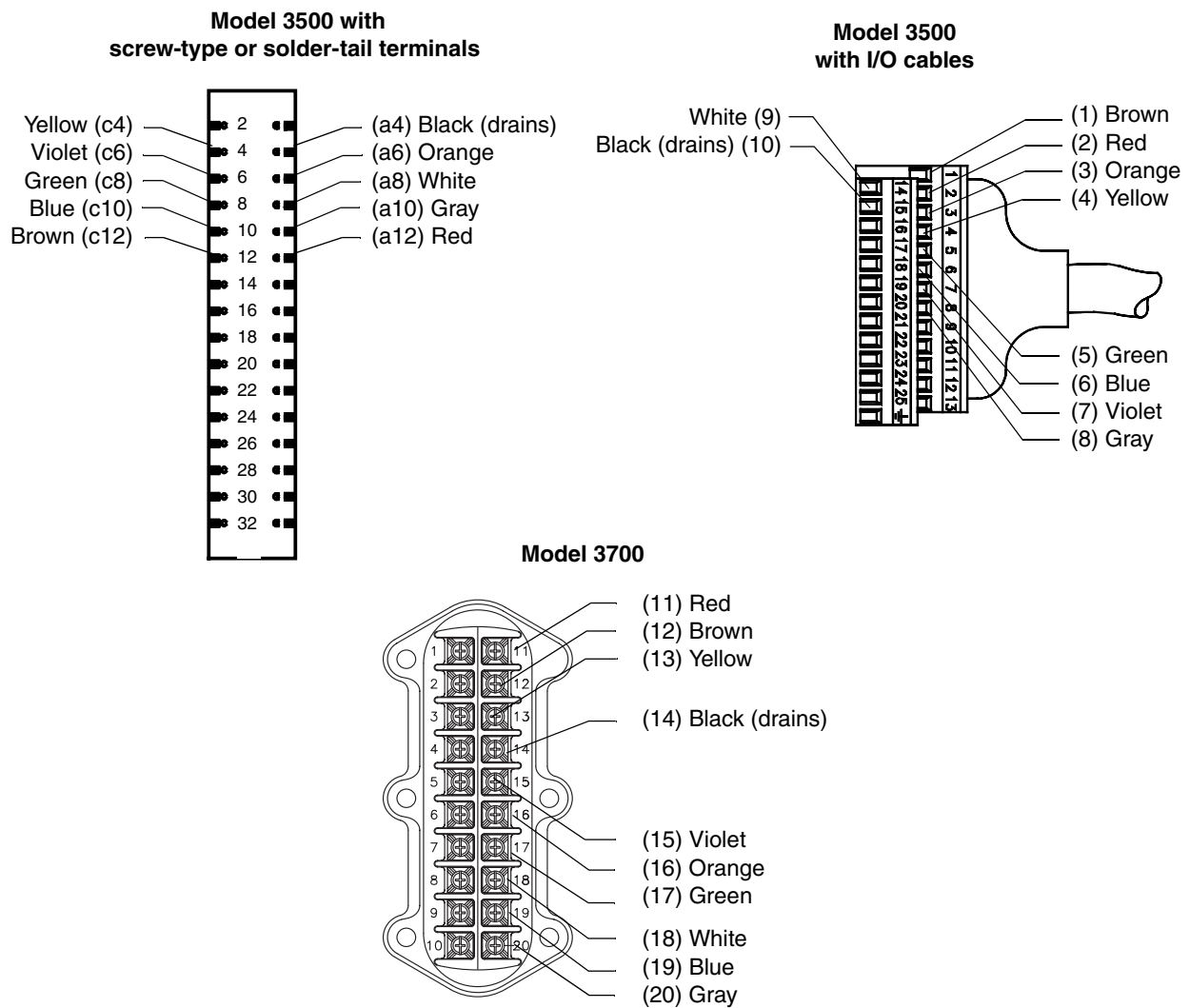
**Figure A-4 RFT9739 and IFT9701 transmitter terminal blocks**





# Terminal Reference

**Figure A-5 Model 3500/3700 9-wire transmitter terminal blocks**







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