Installation Manual
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Micro Motion®
LF-Series Flowmeters

Sensor/Transmitter Installation Manual

Micro Motion®

EMERSON™
Process Management

Contents

Chapter 1
Before You Begin

1.1 Overview

This chapter provides an orientation to the use of this manual. This manual describes the procedures required to install the following components:

- All LF-Series sensors
- All LF-Series field-mount transmitters
- All LF-Series DIN rail mount transmitters

If you do not know what sensor or transmitter you have, see Section 1.6 for instructions on identifying the component type from the part number on the tag.

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.

⚠ CAUTION

Improper installation could cause measurement error or flowmeter failure.

Follow all instructions to ensure transmitter will operate correctly.

1.3 Flowmeter components

The LF-Series flowmeter includes the following components:

- One of the following LF-Series sensors:
  - LF2M
  - LF3M
  - LF4M
- One of the following LF-Series transmitters:
  - LF-Series field-mount transmitter with the 1 mA/1 FO outputs option board (flow-only)
  - LF-Series field-mount transmitter with the 1 mA/1 FO outputs option board (multivariable)
  - LF-Series field-mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)
  - LF-Series field-mount transmitter with the FOUNDATION™ fieldbus outputs option board
  - LF-Series field-mount transmitter with the Profibus-PA outputs option board
  - LF-Series DIN rail mount transmitter with the 1 mA/1 FO outputs option board (flow-only)
  - LF-Series DIN rail mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)

To identify your sensor and transmitter type, see Section 1.6.

1.4 Transmitter codes used in this manual

In this manual, codes are used to identify specific LF-Series transmitter types. The codes are listed in Table 1-1.

Table 1-1 Transmitter codes

Transmitter type	Code
LF-Series field-mount transmitter with the 1 mA/1 FO outputs option board (flow-only or multivariable)	FM AN
LF-Series field-mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)	FM CIO
LF-Series field-mount transmitter with the FOUNDATION fieldbus outputs option board	FM FB
LF-Series field-mount transmitter with the Profibus-PA outputs option board	FM PA
LF-Series DIN rail mount transmitter with the 1 mA/1 FO outputs option board (flow-only)	DIN AN
LF-Series DIN rail mount transmitter with the 2 mA/1 FO outputs option board (multivariable, configurable)	DIN CIO

1.5 Installation procedures

To install the LF-Series flowmeter, the following procedures are required:

- Install the sensor (all models) – see Chapter 2
- Install the transmitter
  - LF-Series field-mount transmitters – see Chapter 3
  - LF-Series DIN rail mount transmitters – see Chapter 4
- Wire the transmitter to the sensor – see Chapter 5
- Wire the transmitter outputs or connect the communication wires:
  - LF Series FM AN transmitters – see Chapter 6
  - LF-Series FM CIO transmitters – see Chapter 7
  - LF-Series FM FB or PA transmitters – see Chapter 8
  - LF-Series DIN AN transmitters – see Chapter 9
  - LF-Series DIN CIO transmitters – see Chapter 10

1.6 LF-Series model numbers

The LF-Series sensor model number has the following form:

LFxMxxxxxxxxxx

The first four characters identify the sensor model.

The LF-Series transmitter model number has the following form:

LFTxxxxxxxx

where the fourth character identifies the transmitter type:

- **1** and **3** = FM AN
- **2** = DIN AN
- **4** = FM CIO
- **5** = DIN CIO
- **6** = FM FB
- **7** = FM PA

1.7 Additional documentation

For information on transmitter configuration and use, and flowmeter troubleshooting, see *LF-Series Transmitters*: *Configuration and Use, LF-Series Transmitters with FOUNDATION Fieldbus: Configuration and Use,* or *LF-Series Transmitters with Profibus-PA: Configuration and Use.*

Chapter 2
Installing the Sensor

2.1 Overview

This chapter describes how to install Micro Motion LF-Series sensors. The following general steps are required:

- Determine the location of the sensor (see Section 2.3)
- Orient the sensor (see Section 2.4)
- Mount the sensor (see Section 2.5)
- Ground the sensor (see Section 2.6)

2.2 European installations

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/atex** or through your local Micro Motion support center.

2.3 Determining a location

Choose a location for the sensor based on the requirements described in this section. The following general guidelines can help you select an appropriate location for the sensor.

- You should be able to stop flow through the sensor to facilitate the zeroing procedure.
- For optimal performance, the sensor should remain full of process fluid.
- The sensor must be installed in an area that is compatible with the classification specified on the approvals tag (see Table A-4).

2.3.1 Hazardous area installations

Make sure the hazardous area specified on the sensor approvals tag is suitable for the environment in which the sensor is installed (see Table A-4).

2.3.2 Distance from transmitter

The maximum cable length between the sensor and the transmitter is 1000 ft (300 m).

If you are installing the LF-Series sensor for use in an MVD™ Direct Connect™ installation:

- The maximum cable length between the sensor and the direct host is 1000 ft (300 m).
- The maximum cable length between the sensor and the power supply depends on the wire size, as shown in Table 2-1. The wire must be sized to provide a minimum of 15 V at the sensor. See the discussion in Section 5.4.1.

Table 2-1 Power supply wire size and cable length – MVD Direct Connect installations

Wire size	Maximum length
22 AWG (0,35 mm^2)	300 ft (90 m)
20 AWG (0,5 mm^2)	500 ft (150 m)
18 AWG (0,8 mm^2)	500 ft (150 m)

Micro Motion supplies 4-wire cable to connect the sensor to the transmitter or remote host. The cable is fitted with a Eurofast® connector for connection to the sensor. Cable can be ordered in lengths ranging from 6.5 ft (2 m) to 500 ft (150 m). For longer cable lengths, contact the factory.

2.3.3 Pipe run

Micro Motion sensors do not require a straight run of pipe upstream or downstream.

2.3.4 Shutoff valve

After the sensor and transmitter have been installed, you must perform the zeroing procedure. During the zeroing procedure, flow through the sensor must be halted and the sensor tubes must be completely full of process fluid. A shutoff valve, downstream from the sensor, is recommended to halt flow during the zeroing procedure. For more information about zeroing, refer to the instruction manual shipped with the transmitter.

2.4 Orienting the sensor

The sensor will function properly in any orientation if the sensor tubes remain filled with process fluid.

2.4.1 Flow direction arrow

The sensor has a flow direction arrow to help you configure the transmitter for flow direction. If possible, install the sensor so that the flow direction arrow matches actual process flow.

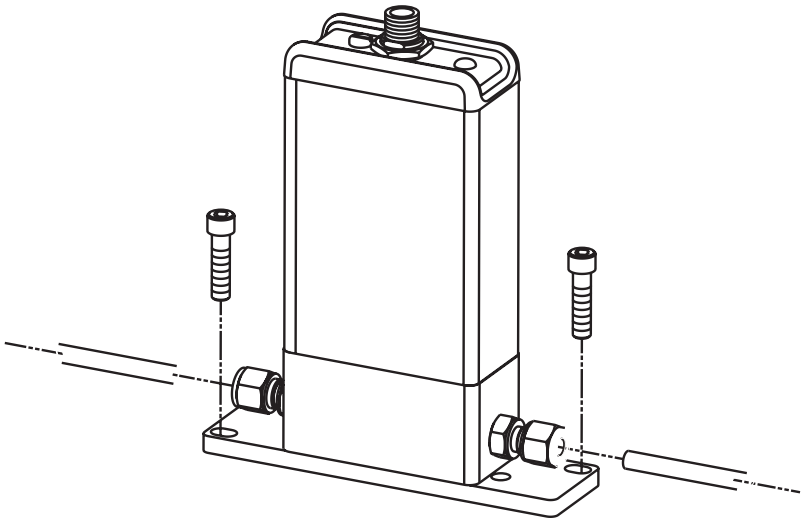
2.4.2 Vertical pipeline

If the sensor is installed in a vertical pipeline, liquids and slurries should flow upward through the sensor. Gases may flow upward or downward.

2.5 Mounting the sensor

Use your common practices to minimize torque and bending load on process connections. Figure 2-1 illustrates how to mount the sensor.

Figure 2-1 Mounting an LF-Series sensor



2.6 Grounding the sensor

The sensor's mounting plate must be grounded to earth.

⚠ CAUTION

Improper grounding could cause measurement error.

To reduce the risk of measurement error:

- Ground the flowmeter to earth, or follow ground network requirements for the facility.
- For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

If national standards are not in effect, follow these grounding guidelines:

- Use copper wire, 14 AWG (2,5 mm^2) or larger wire size, for grounding.
- Keep all ground leads as short as possible, less than 1 Ω impedance.
- Connect ground leads directly to earth, or follow plant standards.

Chapter 3
Installing the Field-Mount Transmitter

3.1 Overview

This chapter describes how to install Micro Motion LF-Series field-mount transmitters. The following general steps are required:

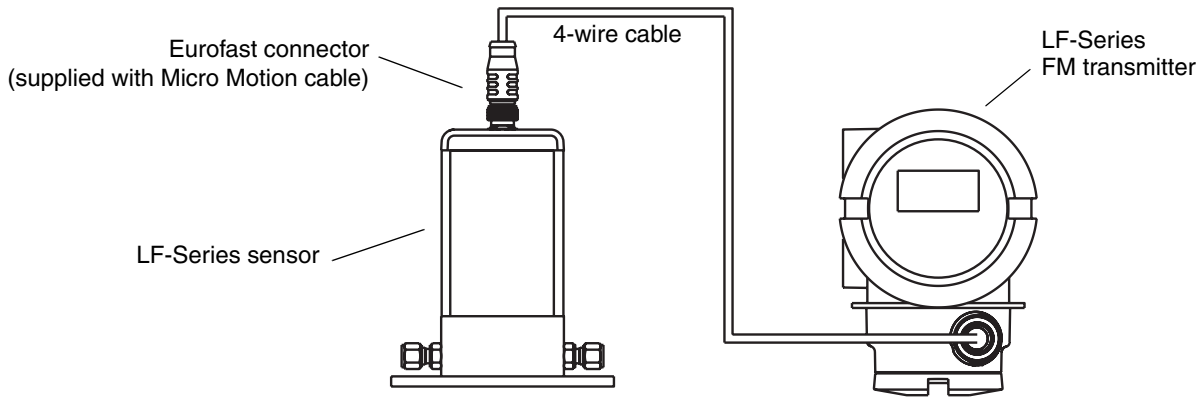
- Determine the location of the transmitter and other flowmeter components (see Section 3.2)
- Mount the transmitter (see Section 3.3)
- Ground the transmitter (see Section 3.4)
- Supply power to the flowmeter (see Section 3.5)
- Rotate the display, if desired and the transmitter has a display (see Section 3.6)

3.2 Determining an appropriate location

To determine an appropriate location for the transmitter, you must consider the environmental requirements of the transmitter, hazardous area classification, location of power source, cable lengths, accessibility for maintenance, and visibility of the display (if the transmitter is equipped with a display).

The field-mount installation architecture is shown in Figure 3-1.

Figure 3-1 Installation architecture



3.2.1 Environmental requirements

The transmitter's environmental requirements include temperature, humidity, and vibration.

Temperature limits

Install the transmitter in an environment where ambient temperature is between –40 and +140 °F (–40 and +60 °C). If possible, install the transmitter in a location that will prevent direct exposure to sunlight.

Different ambient temperature requirements may apply, depending on your installation. Refer to the approvals documentation shipped with the transmitter or available on the Micro Motion web site.

Humidity limits

Install the transmitter in an environment where relative humidity is between 5 and 95%, non-condensing at 140 °F (60 °C).

Vibration limits

The transmitter meets IEC 68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g.

3.2.2 Hazardous area classifications

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 approvals tag attached to the transmitter housing.

For more information about hazardous area classifications and requirements, see Section A.3.2, Table A-16.

3.2.3 Power source

The transmitter must be connected to an AC or DC voltage source. The transmitter automatically recognizes the source voltage.

AC power requirements

If you are using AC power, the following requirements apply:

- 85–265 VAC
- 50/60 Hz
- 6 watts typical, 11 watts maximum

DC power requirements

Note: These requirements assume a single transmitter per cable. Connecting multiple transmitters to a single cable should generally be avoided.

If you are using DC power, the following requirements apply:

- 18–100 VDC
- 6 watts typical, 11 watts maximum
- At startup, the transmitter 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 0.5 amps. To size the cable, refer to Table 3-1 and use the following formula as a guideline:

$$\text{MinimumSupplyVoltage} = 18\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.5\text{A})$$

Table 3-1 Typical power cable resistances at 68 °F (20 °C)

Gauge	Resistance[1]
14 AWG	0.0050 Ω/foot
16 AWG	0.0080 Ω/foot
18 AWG	0.0128 Ω/foot
20 AWG	0.0204 Ω/foot
2,5 mm^2	0,0136 Ω/meter
1,5 mm^2	0,0228 Ω/meter
1 mm^2	0,0340 Ω/meter
0,75 mm^2	0,0460 Ω/meter
0,5 mm^2	0,0680 Ω/meter

(1) These values include the resistance of both high and low conductors in a cable.

Example The transmitter is mounted 350 feet from a DC power supply. If you want to use 16 AWG cable, calculate the required voltage at the DC power supply as follows:

$$\text{MinimumSupplyVoltage} = 18\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.5\text{A})$$

$$\text{MinimumSupplyVoltage} = 18\text{V} + (0.0080\ \text{ohms/ft} \times 350\ \text{ft} \times 0.5\text{A})$$

$$\text{MinimumSupplyVoltage} = 19.4\text{V}$$

3.2.4 Distance from sensor

The maximum cable length between the sensor and the transmitter is 1000 ft (300 m).

Micro Motion supplies 4-wire cable to connect the sensor to the transmitter. The cable is fitted with a Eurofast connector for connection to the sensor. Cable can be ordered in lengths ranging from 6.5 ft (2 m) to 500 ft (150 m). For longer cable lengths, contact the factory.

3.2.5 Accessibility for maintenance

Ensure that the transmitter is mounted in a location and orientation that will allow easy access to the terminals and to the display (if your transmitter has a display).

3.3 Mounting the transmitter

You can mount the transmitter in any orientation as long as the conduit and wiring openings do *not* point upward. For transmitter dimensions, see Figure A-1 or Figure A-2.

⚠ CAUTION

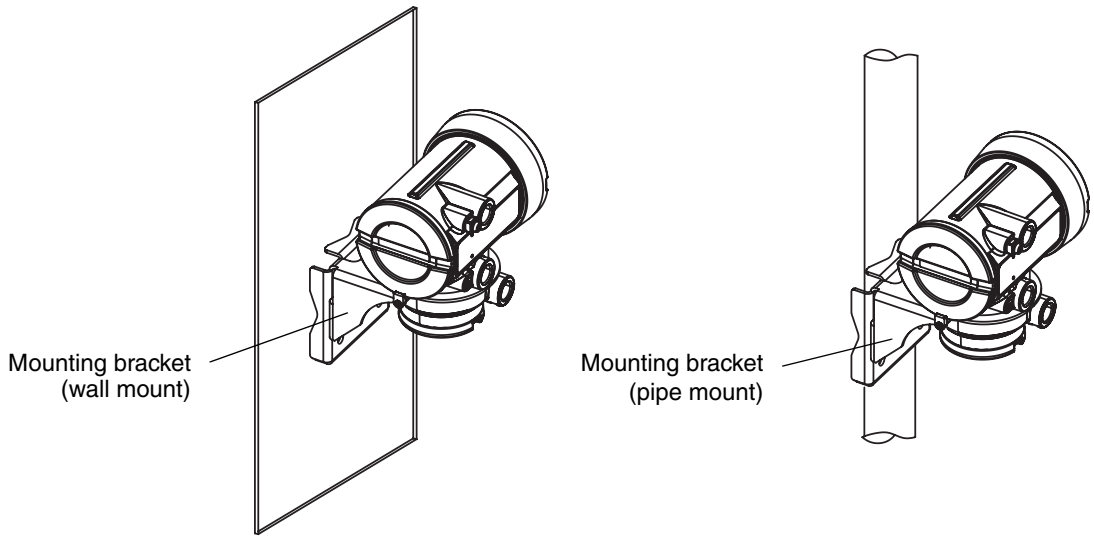
Condensation or excessive moisture entering the transmitter could damage the transmitter and result in measurement error or flowmeter failure.

To reduce the risk of measurement error or flowmeter failure:

- Ensure the integrity of gaskets and O-rings.
- Grease the O-rings every time the transmitter housing is opened and closed.
- Do not mount the transmitter with the conduit openings pointing upward.
- Install drip legs on conduit or cable.
- Seal the conduit openings.
- Fully tighten the transmitter cover.

See Figure 3-2 for a diagram of the mounting bracket supplied with the transmitter. Both pipe mounting and wall mounting are shown. Ensure that the transmitter is mounted and oriented in a way that will allow easy access to the terminals and to the display (if your transmitter has a display).

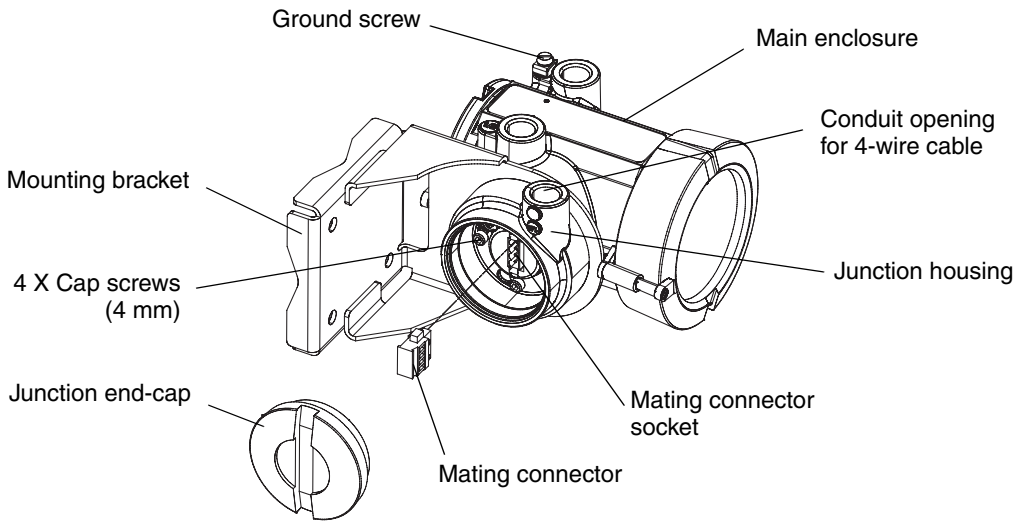
Figure 3-2 4-wire remote – Wall mount or pipe mount



To mount the transmitter:

1. Identify the components shown in Figure 3-3. For dimensions, see Appendix A.
2. If desired, re-orient the transmitter on the bracket.
   a. Remove the junction end-cap from the junction housing.
   b. Loosen each of the four cap screws (4 mm) inside the junction housing.
   c. Rotate the bracket so that the transmitter is oriented as desired.
   d. Tighten the cap screws, torquing to 30 to 38 in-lbs (3 to 4 N-m).
   e. Replace the junction end-cap.
3. Attach the mounting bracket to an instrument pole or wall. For pipe mount, two user-supplied U-bolts are required. Contact Micro Motion to obtain a pipe-mount installation kit if required.

Figure 3-3 Transmitter components – field-mount transmitters



3.4 Grounding the transmitter

⚠ CAUTION

Improper grounding could cause measurement error.

To reduce the risk of measurement error:

- Ground the transmitter to earth, or follow ground network requirements for the facility.
- For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

If national standards are not in effect, follow these transmitter grounding guidelines:

- Use copper wire, 14 AWG (2,5 mm^2) or larger wire size, for grounding.
- Keep all ground leads as short as possible, less than 1 Ω impedance.
- Connect ground leads directly to earth, or follow plant standards.

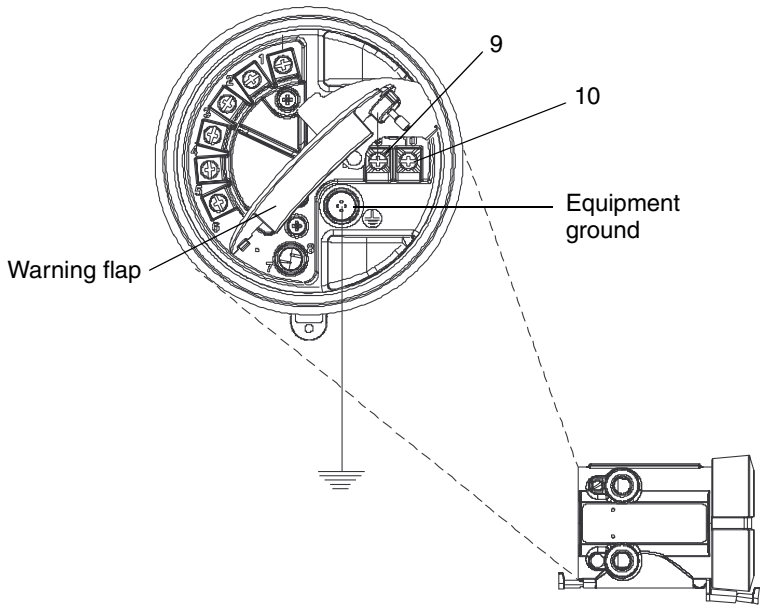
The transmitter has both an internal and an external grounding screw (see Figures 3-3 and 3-4). Ground the transmitter according to applicable local standards.

3.5 Supplying power

In all installations, power must be provided to the transmitter. Refer to Section 3.2.3 for information on the transmitter's power supply requirements.

1. Connect the power supply to terminals 9 and 10, under the Warning flap (see Figure 3-4). Terminate the positive (line) wire on terminal 10 and the return (neutral) wire on terminal 9.
2. Ground the power supply using the equipment ground, also under the Warning flap.
3. A user-supplied switch may be installed in the power supply line. For compliance with low-voltage directive 73/23/EEC (European installations), a switch in close proximity to the transmitter is required.

Figure 3-4 Wiring the transmitter power supply



3.6 Rotating the display

If your transmitter has a display, you can rotate the display on the transmitter up to 360° in 90° increments.

⚠ WARNING

Removing the display cover in explosive atmospheres while the power is on can cause an explosion.

To reduce the risk of an explosion, before removing the display cover in explosive atmospheres, be sure to shut off the power and wait five minutes.

⚠ WARNING

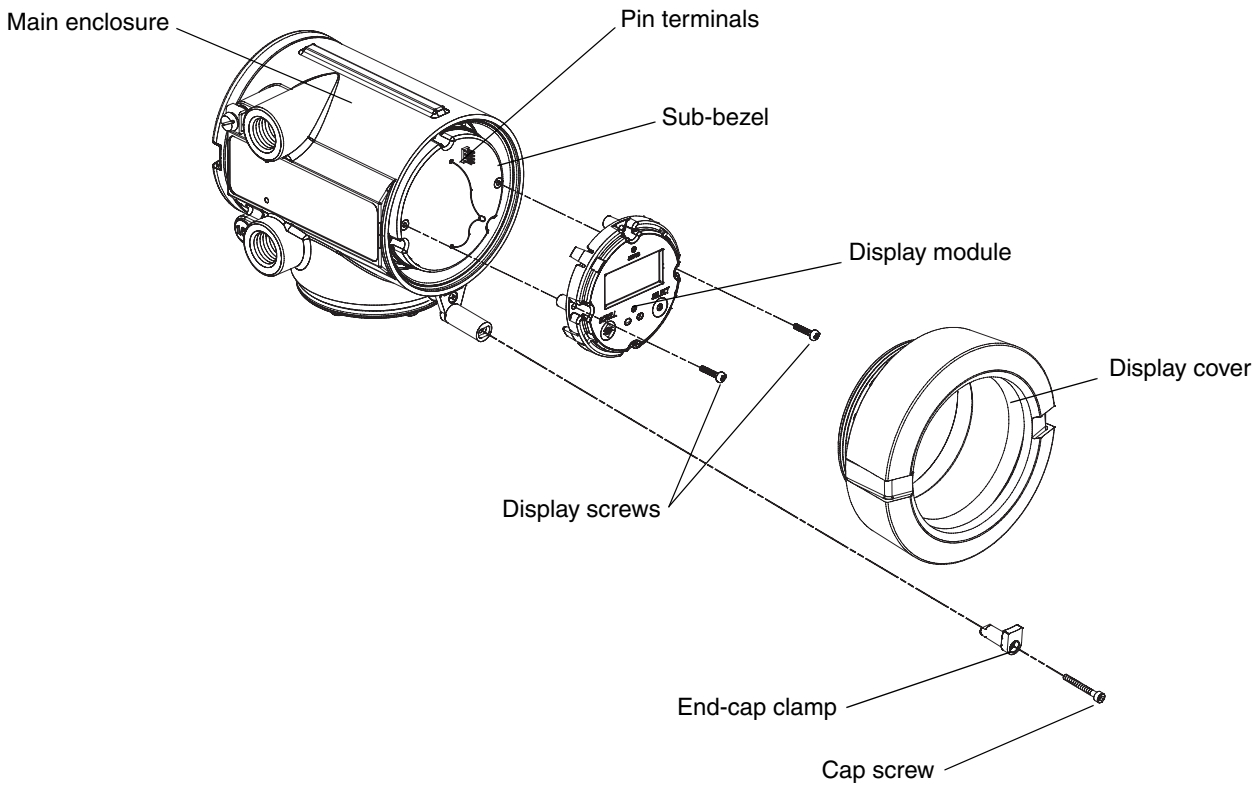
Using a dry cloth to clean the display cover can cause static discharge, which could result in an explosion in an explosive atmosphere.

To reduce the risk of an explosion, always use a damp cloth to clean the display cover in an explosive atmosphere.

To rotate the display, follow the instructions below:

1. Power down the transmitter.
2. Remove the end-cap clamp by removing the cap screw. See Figure 3-5.
3. Turn the display cover counterclockwise to remove it from the main enclosure.
4. Carefully loosen (and remove if necessary) the semicaptive display screws while holding the display module in place.
5. Carefully pull the display module out of the main enclosure until the sub-bezel pin terminals are disengaged from the display module.
6. Rotate the display module to the desired position.
7. Insert the sub-bezel pin terminals into the display module pin holes to secure the display in its new position.
8. If you have removed the display screws, line them up with the matching holes on the sub-bezel, then reinsert and tighten them.
9. Place the display cover onto the main enclosure. Turn the display cover clockwise until it is snug.
10. Replace the end-cap clamp by reinserting and tightening the cap screw.
11. Restore power to the transmitter.

Figure 3-5 Display components



Chapter 4
Installing the DIN Rail Mount Transmitter

4.1 Overview

This chapter describes how to install LF-Series DIN rail mount transmitters. The following general steps are required:

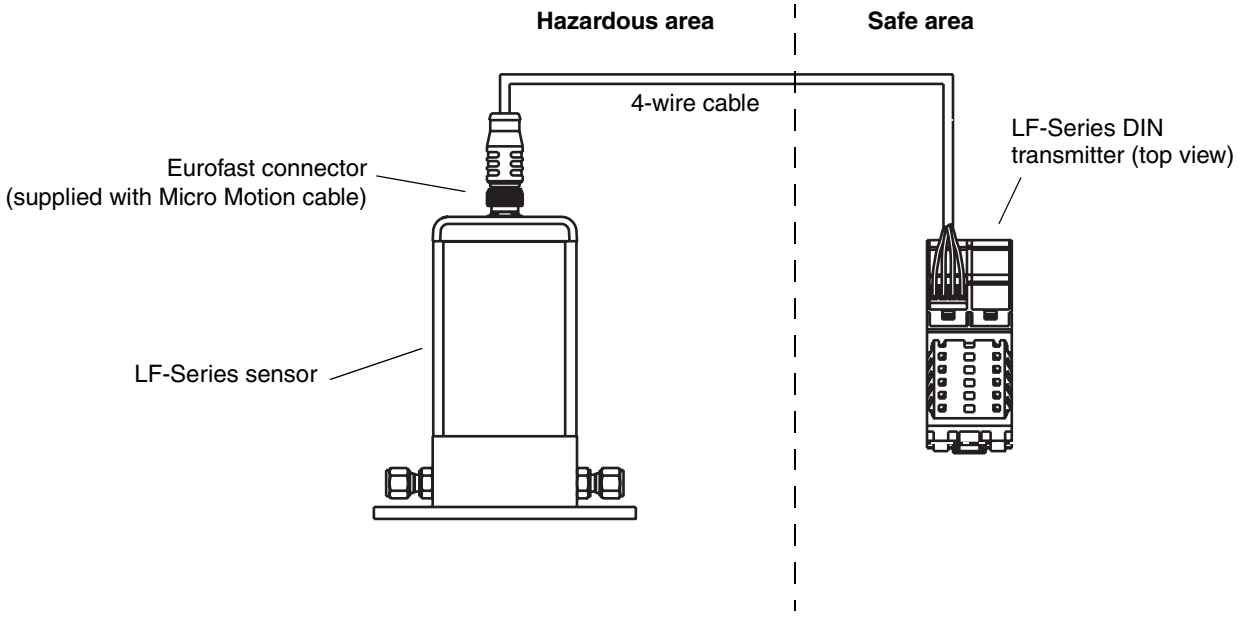
- Determine the location of the transmitter and other flowmeter components (see Section 4.2)
- Mount the transmitter (see Section 4.3)
- Ground the transmitter (see Section 4.4)
- Supply power to the flowmeter (see Section 4.5)

4.2 Determining an appropriate location

See Figure 4.2.5 for the DIN rail mount installation architecture.

To determine an appropriate location for the transmitter, you must consider the temperature requirements of the transmitter, hazardous area issues, location of power source, cable lengths, and accessibility for maintenance.

Figure 4-1 Installation architecture



4.2.1 Temperature requirements

Install the transmitter in an environment where ambient temperature is between –40 and +131 °F (–40 and +55 °C).

Different ambient temperature requirements may apply, depending on your installation. Refer to the approvals documentation shipped with the transmitter or available on the Micro Motion web site.

4.2.2 Hazardous area classifications

The LF-Series DIN rail mount transmitter is designed for installation in a safe area. It can be connected to a sensor located in a hazardous area.

For more information about hazardous area classifications, see Appendix A.

4.2.3 Power source

The transmitter must be connected to a DC voltage source. Do not use an AC power supply.

⚠ CAUTION

Applying AC voltage to the transmitter will damage the device.

To avoid damaging the transmitter, do not connect it to an AC power supply.

The following requirements apply:

- 19.2 to 28.8 VDC at the power terminals, at a load current of 330 mA
- 6.3 watts maximum
- At startup, the transmitter power source must provide a minimum of 1.0 amp of short-term current per transmitter

To size the cable, refer to Table 4-1 and use the following formula as a guideline:

$$\text{MinimumSupplyVoltage} = 19.2\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.33\ \text{A})$$

Table 4-1 Typical power cable resistances at 68 °F (20 °C)

Gauge	Resistance[1]
14 AWG	0.0050 Ω/foot
16 AWG	0.0080 Ω/foot
18 AWG	0.0128 Ω/foot
20 AWG	0.0204 Ω/foot
2,5 mm^2	0,0136 Ω/meter
1,5 mm^2	0,0228 Ω/meter
1 mm^2	0,0340 Ω/meter
0,75 mm^2	0,0460 Ω/meter
0,5 mm^2	0,0680 Ω/meter

(1) These values are based on copper wire, and include the resistance of both wires in a cable. If you are using a material other than copper, refer to the resistivity specifications for your wire type.

Example The transmitter is mounted 350 feet from a DC power supply. If you want to use 16 AWG cable, calculate the required voltage at the DC power supply as follows:

$$\text{MinimumSupplyVoltage} = 19.2 + (\text{CableResistance} \times \text{CableLength} \times 0.33\ \text{A})$$

$$\text{MinimumSupplyVoltage} = 19.2\text{V} + (0.0080\ \text{ohms/ft} \times 350\ \text{ft} \times 0.33\ \text{A})$$

$$\text{MinimumSupplyVoltage} = 20.1\text{V}$$

4.2.4 Distance from sensor

The maximum cable length between the sensor and the transmitter is 1000 ft (300 m).

Micro Motion supplies 4-wire cable to connect the sensor to the transmitter. The cable is fitted with a Eurofast® connector for connection to the sensor. Cable can be ordered in lengths ranging from 6.5 ft (2 m) to 500 ft (150 m). For longer cable lengths, contact the factory.

4.2.5 Accessibility for maintenance

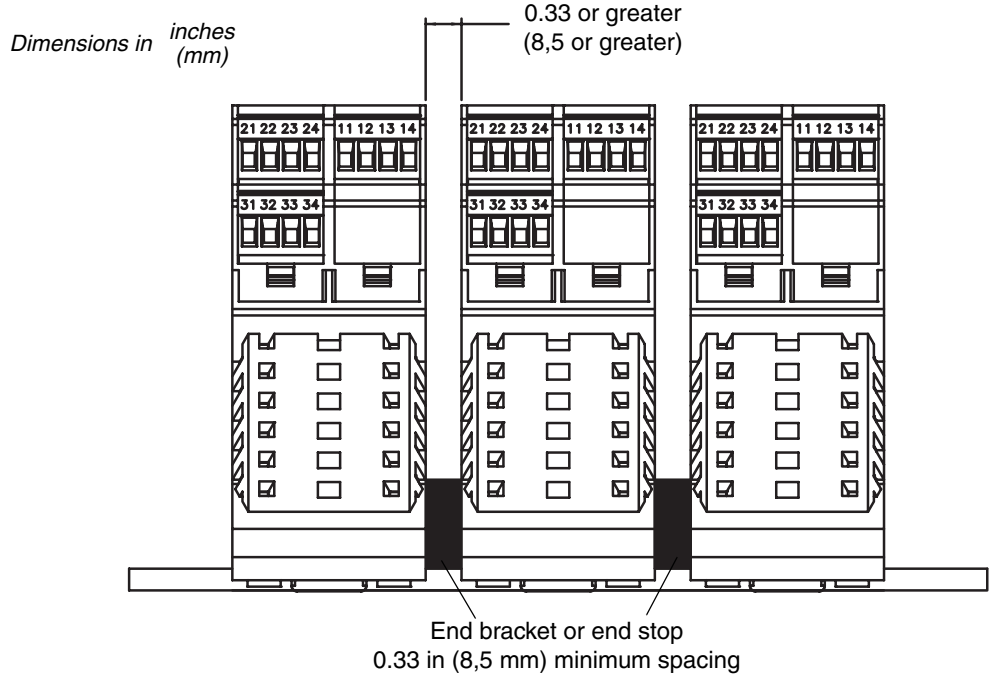
Ensure that the transmitter is mounted in a location that will allow easy access to the terminals and the front panel.

4.3 Mounting and removing the transmitter

The transmitter is designed to be mounted on a 35 mm rail. The DIN rail must be grounded. See Figure A-3 for dimensions.

If the temperature is above 113 °F (45 °C) and you are mounting multiple transmitters, they must be mounted at least 0.33 in (8,5 mm) apart. Use an end bracket or end stop to space the transmitters. See Figure 4-2.

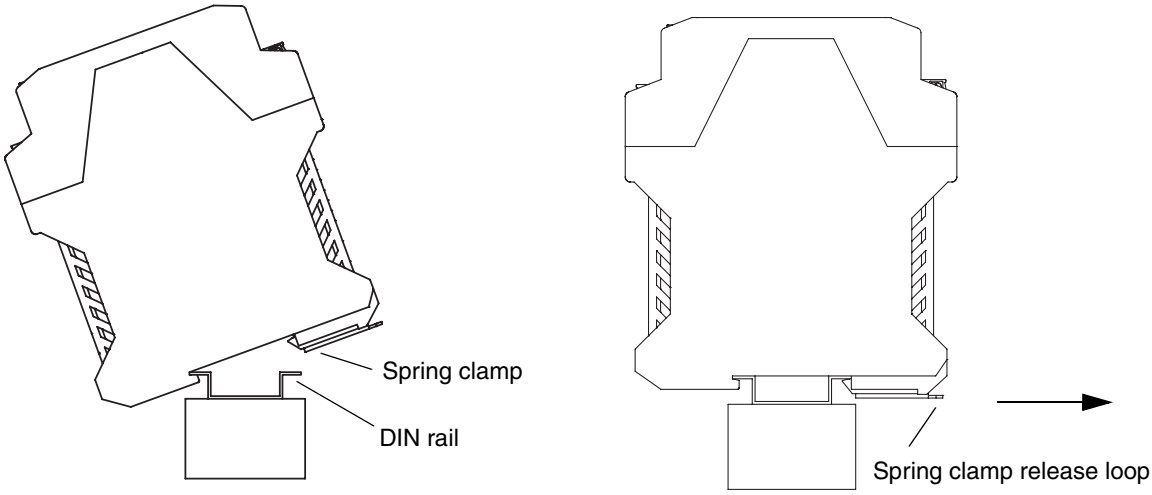
Figure 4-2 Mounting multiple transmitters



To mount the transmitter:

1. Locate the transmitter in the desired position on the DIN rail.
2. Place the slot on back of the transmitter against the rail (see Figure 4-3).
3. Apply pressure to the transmitter until the spring clamp snaps onto the rail.

Figure 4-3 Mounting and removing the transmitter



To remove the transmitter:

1. Slide a screwdriver into the spring clamp release loop (see Figure 4-3).
2. Pull the spring clamp away from the transmitter.
3. Lift the transmitter from the rail.

4.4 Grounding the transmitter

⚠ CAUTION

Improper grounding could cause measurement error.

To reduce the risk of measurement error:

- Ground the transmitter to earth, or follow ground network requirements for the facility.
- For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.

If national standards are not in effect, follow these transmitter grounding guidelines:

- Use copper wire, 14 AWG (2,5 mm^2) or larger wire size, for grounding.
- Keep all ground leads as short as possible, less than 1 Ω impedance.
- Connect ground leads directly to earth, or follow plant standards.

To ground the transmitter, ground the DIN rail. A rail clip in the base of the transmitter housing grounds the transmitter to the DIN rail.

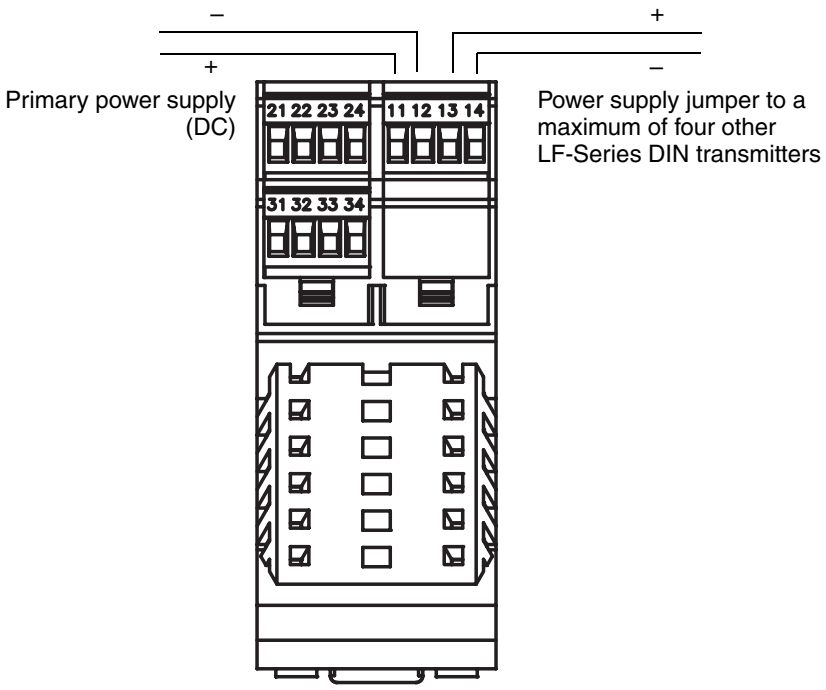
4.5 Supplying power

In all installations, power must be provided to the transmitter. Refer to Section 4.2.3 for information on the transmitter's power supply requirements.

Connect the power supply to terminals 11 and 12. Terminate the positive wire on terminal 11 and the negative wire on terminal 12. See Figure 4-4.

Terminals 13 and 14 are used to jumper power to another LF-Series DIN transmitter. A maximum of five transmitters can be jumpered together.

Figure 4-4 Wiring the transmitter power supply



Chapter 5
Wiring the Sensor to the Transmitter

5.1 Overview

This chapter describes how to connect Micro Motion LF-Series sensors to LF-Series transmitters. This chapter also describes how to connect the LF-Series sensor to a remote host, for use in MVD Direct Connect installations.

⚠ CAUTION

Large electromagnetic fields can interfere with flowmeter communication signals.

Improper installation of cable or conduit can cause measurement error or flowmeter failure. To reduce the risk of measurement error or flowmeter failure, keep cable or conduit away from devices such as transformers, motors, and power lines which produce large electromagnetic fields.

5.2 Cable types

Micro Motion offers 4-wire cable with a factory-installed Eurofast connector.

5.3 Wiring to FM or DIN transmitters

To connect the cable, follow the steps below.

1. To connect the cable to the sensor, plug the Eurofast connector onto the top of the sensor connection. The connector is keyed for appropriate orientation.
2. Identify the wires in the 4-wire cable. The 4-wire cable supplied by Micro Motion consists of one pair of 18 AWG (0,75 mm^2) wires (brown and black), which should be used for the VDC connection, and one pair of 22 AWG (0,35 mm^2) wires (blue and white), which should be used for the RS-485 connection.
3. To connect:
   - To a field-mount transmitter, connect the four wires from the sensor to terminals 1–4 on the mating connector of the transmitter. See Figure 5-1. Do not ground the shield, braid, or drain wire(s) at the transmitter.
   - To a DIN rail mount transmitter, connect the four wires from the sensor to terminals 1–4 on the transmitter. See Figure 5-2. Do not ground the shield, braid, or drain wire(s) at the transmitter.

Figure 5-1 4-wire cable between sensor and FM transmitter

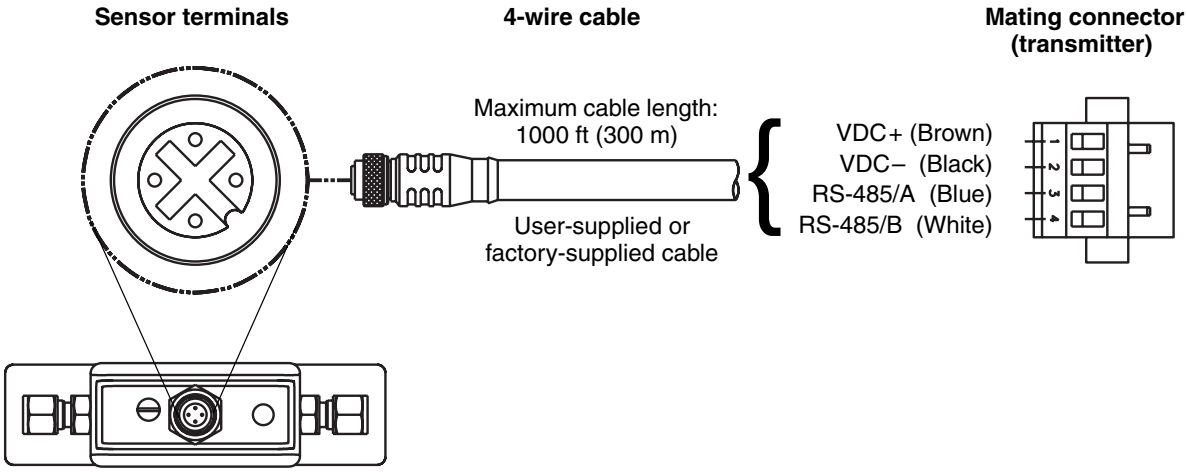
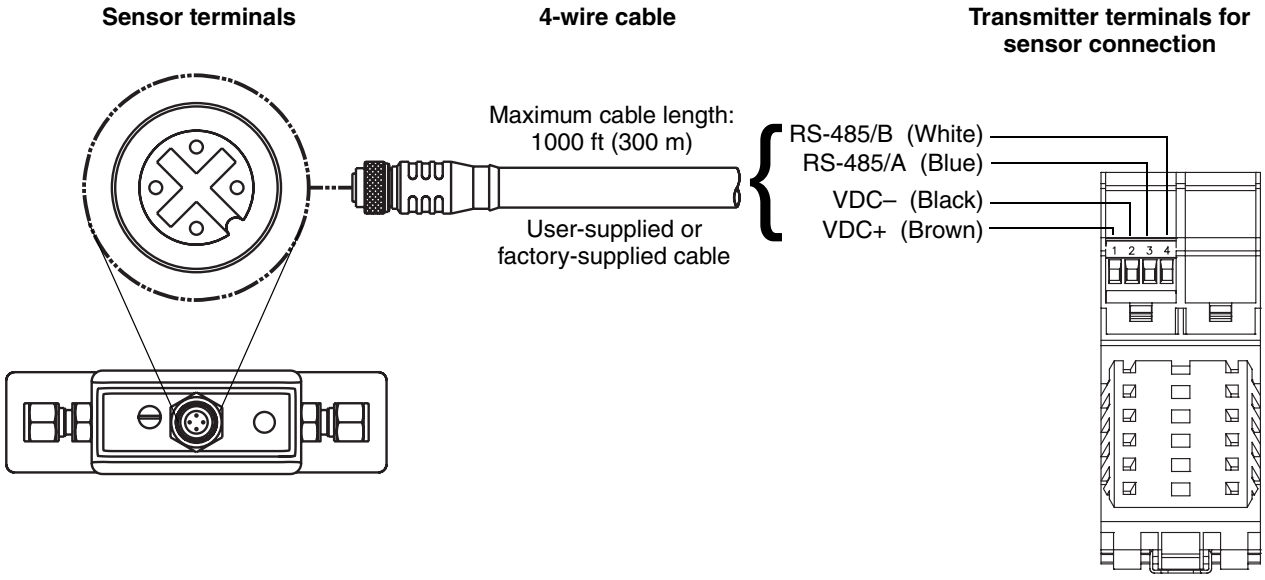


Figure 5-2 4-wire cable between sensor and DIN transmitter



5.4 MVD Direct Connect wiring

Note: This section applies only to LF-Series sensors used in MVD Direct Connect installations.

Note: MVD Direct Connect installations based on the LF-Series sensor cannot include the MVD Direct Connect I.S. barrier.

In MVD Direct Connect installations, you must connect the sensor to a remote host and to a power supply.

5.4.1 Power supply requirements

The power supply must meet the following requirements:

- Power must be supplied from a common floating regulated power supply with the correct voltage.
- The voltage requirement for a single sensor is 15–26 VDC. The maximum power consumption of a single sensor is approximately 3 W.
- The power supply may be used to power any number of sensors, but must not be used to power other devices.
- Use shielded wiring.
- The power supply must not allow power surges or conducted radio frequency interference (RFI) to propagate through to its output.
- The power supply must not be grounded.

⚠ CAUTION

Grounding the power supply to the sensor can cause damage to the sensor or the remote host.

To avoid damaging the sensor or the remote host, ensure that the power supply to the sensor is not grounded.

- In EU countries, the power supply must meet the requirements of the EMC directive.
- The power supply cable must comply with the size and length requirements listed in Table 2-1. A minimum DC input of 15 V is required for each sensor. At startup, the power source must provide a minimum of 0.2 A of short-term current per sensor. The maximum steady state current is 0.15 A. For assistance in sizing the power supply cable, refer to Table 5-1 and use the equation below:

$$\text{MinimumSupplyVoltage} = 15\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.15\text{A})$$

Table 5-1 Typical power cable resistances at 68 °F (20 °C)

Gauge	Resistance[1]
14 AWG	0.0050 Ω/foot
16 AWG	0.0080 Ω/foot
18 AWG	0.0128 Ω/foot
20 AWG	0.0204 Ω/foot
22 AWG	0.0328 Ω/foot
2,5 mm^2	0,0136 Ω/meter
1,5 mm^2	0,0228 Ω/meter
1 mm^2	0,0340 Ω/meter
0,75 mm^2	0,0460 Ω/meter
0,5 mm^2	0,0680 Ω/meter

(1) These values include the resistance of both high and low conductors in a cable.

Example The sensor is mounted 350 feet from a DC power supply. If you want to use 18 AWG cable, calculate the required voltage at the DC power supply as follows:

$$\text{MinimumSupplyVoltage} = 15\text{V} + (\text{CableResistance} \times \text{CableLength} \times 0.15\text{A})$$

$$\text{MinimumSupplyVoltage} = 15\text{V} + (0.0128\ \text{ohms/ft} \times 350\ \text{ft} \times 0.15\text{A})$$

$$\text{MinimumSupplyVoltage} = 15.7\text{V}$$

5.4.2 Wiring

To connect the cable, follow the steps below.

1. To connect the cable to the sensor, plug the Eurofast connector onto the top of the sensor connection. The connector is keyed for appropriate orientation.
2. At the remote host:
   a. Open the wiring compartment and identify the RS-485 terminals. Refer to the vendor documentation if required.
   b. Connect the RS-485 wires from the sensor to the RS-485 terminals at the remote host. The blue wire is RS-485/A; the white wire is RS-485/B.
   c. Do not terminate the shield, braid, or drain wire(s) at the remote host.
   d. Do not terminate the RS-485 lines using the standard 60-ohm termination resistor. If possible, do not terminate the RS-485 lines at all. If the RS-485 cable is 1000 feet (300 meters) long or longer, and termination is required, the total termination must be 175 ohm or above.
   e. Close the wiring compartment.
3. At the power supply, connect the power supply wires from the sensor to the power supply, matching positive and negative (+ and –). The brown wire is VDC+; the black wire is VDC–.

Chapter 6
I/O Wiring – FM AN Transmitters

6.1 Overview

This chapter explains how to wire outputs for LF-Series field-mount AN transmitters. If you don't know your transmitter type, see Section 1.6.

It is the user's responsibility to verify that the specific installation meets the local and national safety requirements and electrical codes.

6.2 Output terminals and output types

Table 6-1 describes the outputs and communication protocols available for the LF-Series field-mount AN transmitter.

Table 6-1 Terminals and output types

Terminals	Output type	Communication
1 & 2	Milliamp/Bell 202[(1)]	HART
3 & 4	Frequency	None
5 & 6	RS-485	• Modbus (default) • HART

(1) The Bell 202 signal is superimposed on the mA output.

6.3 Output wiring

Output wiring requirements depend on how you will use the analog functionality and the HART or Modbus protocol. This chapter describes several possible configurations:

- Figure 6-1 shows the wiring requirements for the mA output (terminals 1 and 2) and the frequency output (terminals 3 and 4).
- Figure 6-2 shows the wiring requirements for the mA output (terminals 1 and 2) if it will be used for HART communications in addition to the mA signal.
- Figure 6-3 shows the wiring requirements for RS-485 communications using the RS-485 output (terminals 5 and 6).
- Figure 6-4 shows the wiring requirements for connecting the transmitter to a HART multidrop network.

Figure 6-1 Basic analog wiring

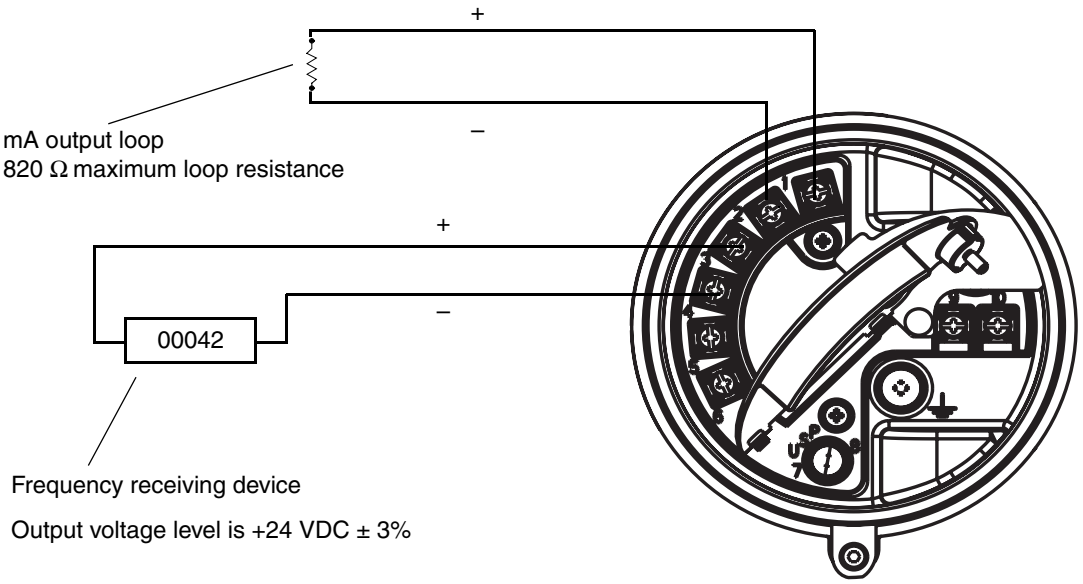


Figure 6-2 HART/analog single-loop wiring

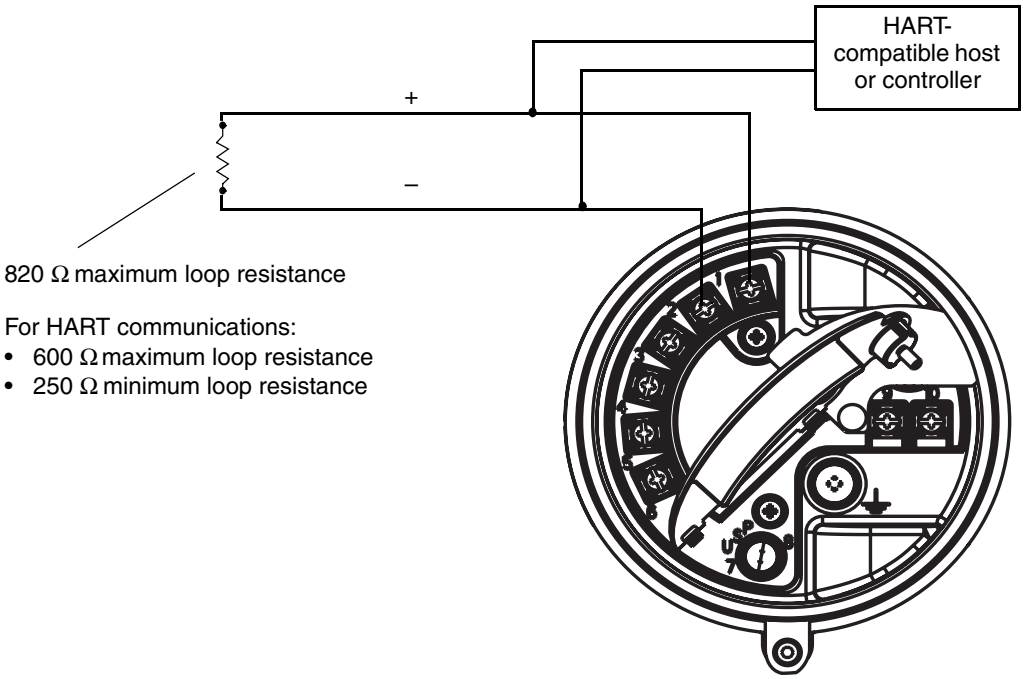
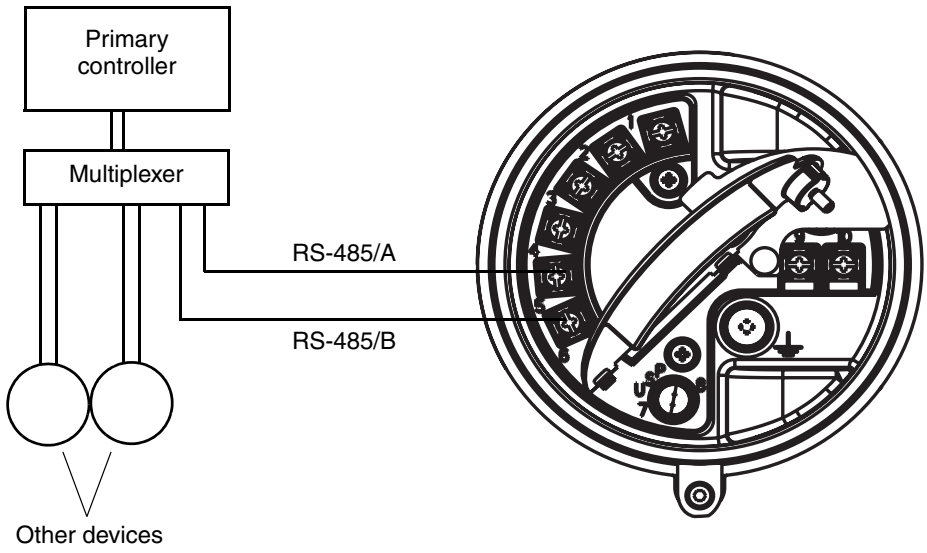
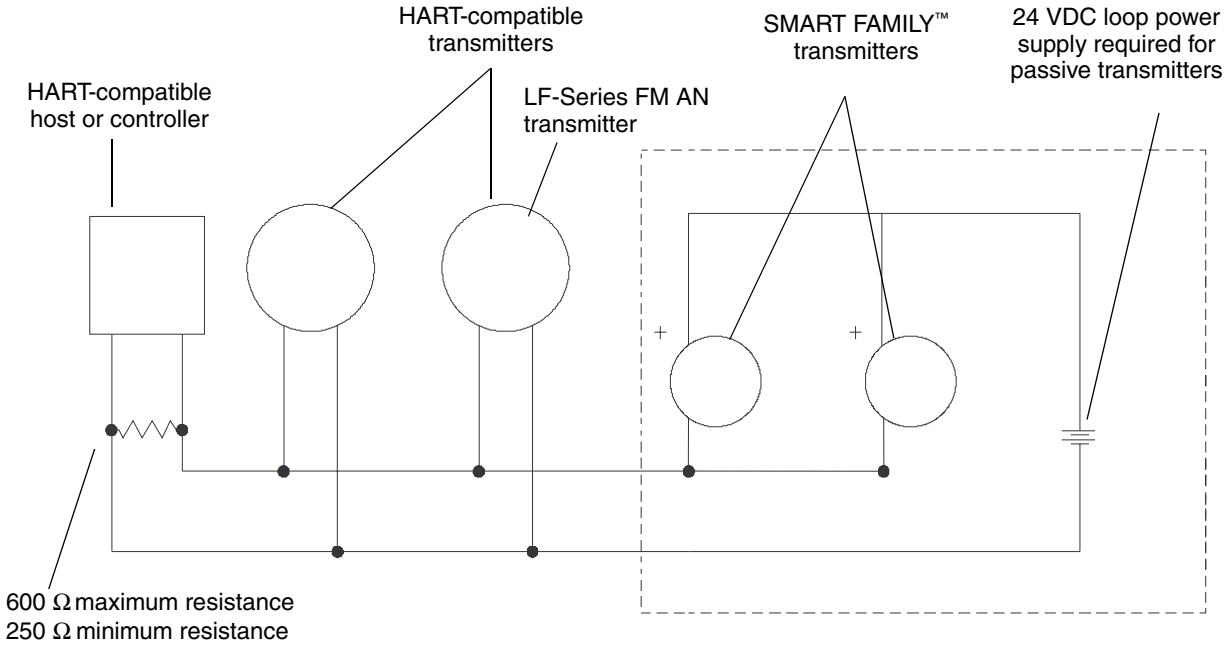


Figure 6-3. RS-485 point-to-point wiring



Note: The RS-485 communication wires must be shielded.

Figure 6-4 HART multidrop wiring with SMART FAMILY™ transmitters and a configuration tool



Note: For optimum HART communication, make sure the output loop is single-point-grounded to an instrument-grade ground.

Chapter 7
I/O Wiring – FM CIO Transmitters

7.1 Overview

This chapter explains how to wire outputs for LF-Series field-mount CIO transmitters. If you don't know your transmitter type, see Section 1.6.

It is the user's responsibility to verify that the specific installation meets the local and national safety requirements and electrical codes.

7.2 Channel configuration

The six output terminals are divided into three pairs. The pairs are called Channels A, B, and C. Channel A is terminals 1 and 2; Channel B is terminals 3 and 4; and Channel C is terminals 5 and 6. Variable assignments are governed by channel configuration.

Output wiring requirements depend on how you will configure the transmitter channels. The configuration options are shown in Table 7-1 and Figure 7-1. You can use a HART Communicator or ProLink II software to configure channels. See the transmitter configuration manual for more information.

If Channel B is configured as a frequency output or discrete output, it can also be configured to use either internal or external power. Channel C can be configured to use either internal or external power, independent of its output configuration.

- "Internal power" means that the terminals are powered automatically by the transmitter. The output wiring instructions do not include power setup and power wiring.
- "External power" means that the terminals must be connected to an independent power supply. The output wiring instructions include power setup and power wiring.

Note: The terms "active" and "passive" are sometimes used to describe internally and externally powered outputs.

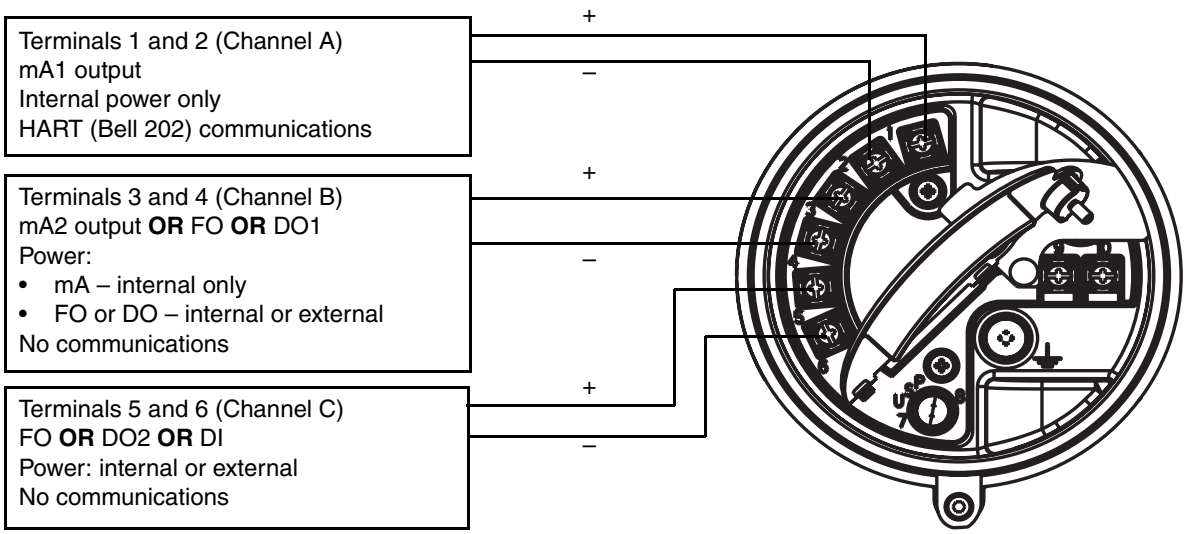
Note: You cannot configure the following combination: Channel B = discrete output, Channel C = frequency output. If you need both a frequency output and a discrete output, use the following: Channel B = frequency output, Channel C = discrete output. For more information, see the transmitter configuration manual.

Table 7-1 Channel configuration

Channel	Terminals	Configuration options	Power
A	1 & 2	mA output with HART/Bell 202(1)	Internal
B	3 & 4	• mA output (default)	Internal
		• Frequency output	Internal or external(2)
		• Discrete output	Internal or external
C	5 & 6	• Frequency output (default)(3)	Internal or external
		• Discrete output	Internal or external
		• Discrete input	Internal or external

(1) The Bell 202 signal is superimposed on the mA output.
(2) You must provide power to the outputs when a channel is set to external power.
(3) When configured for two frequency outputs (dual pulse), frequency output 2 is generated from the same signal that is sent to the first frequency output. Frequency output 2 is electrically isolated but not independent.

Figure 7-1 Configuration of configurable I/O terminals



mA = milliamp
FO = frequency output
DO = discrete output
DI = discrete input

7.3 mA output wiring

The following 4–20 mA wiring diagrams are examples of proper basic wiring for the LF-Series FM CIO transmitter's primary and secondary mA outputs. The following options are shown:

- Basic mA wiring (Figure 7-2)
- HART/analog single-loop wiring (Figure 7-3)
- HART multidrop wiring (Figure 7-4)

Figure 7-2 Basic mA wiring

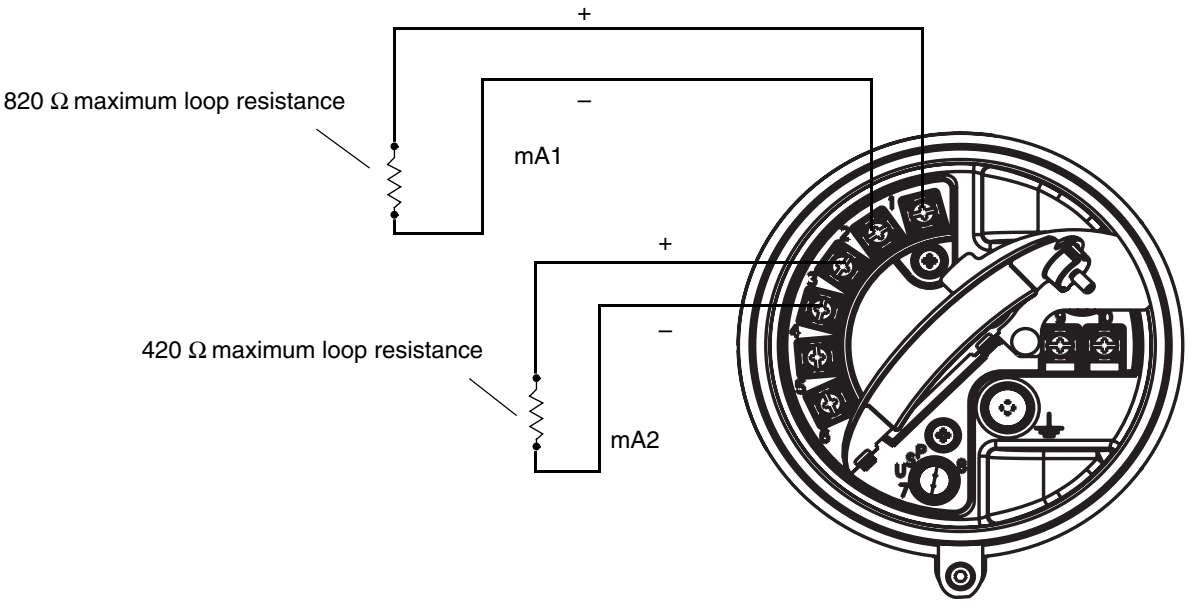


Figure 7-3 HART/analog single-loop wiring

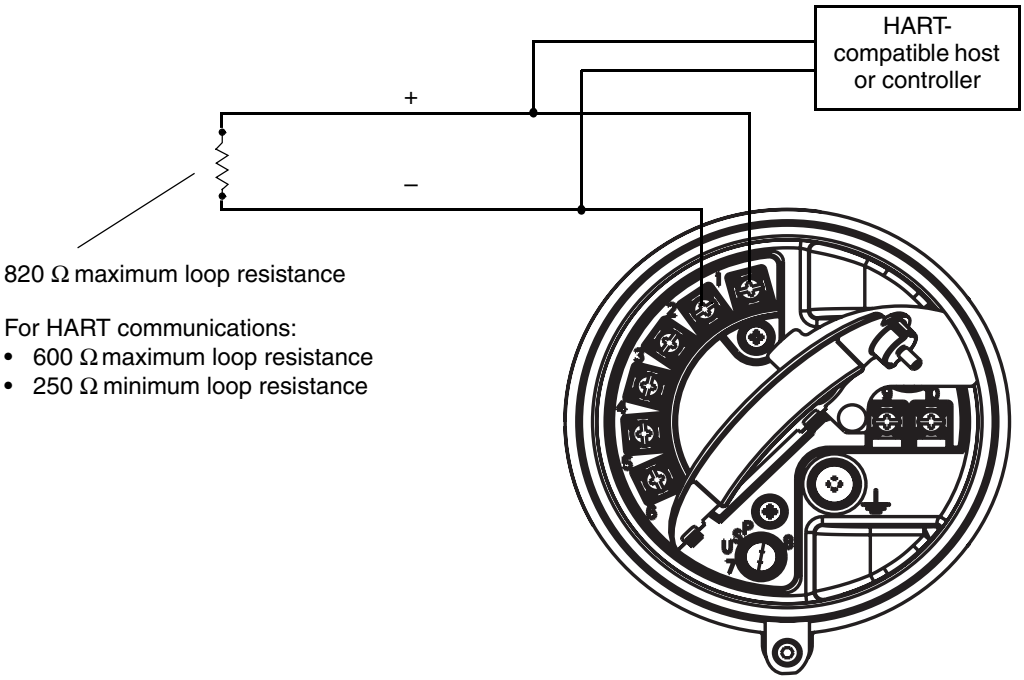
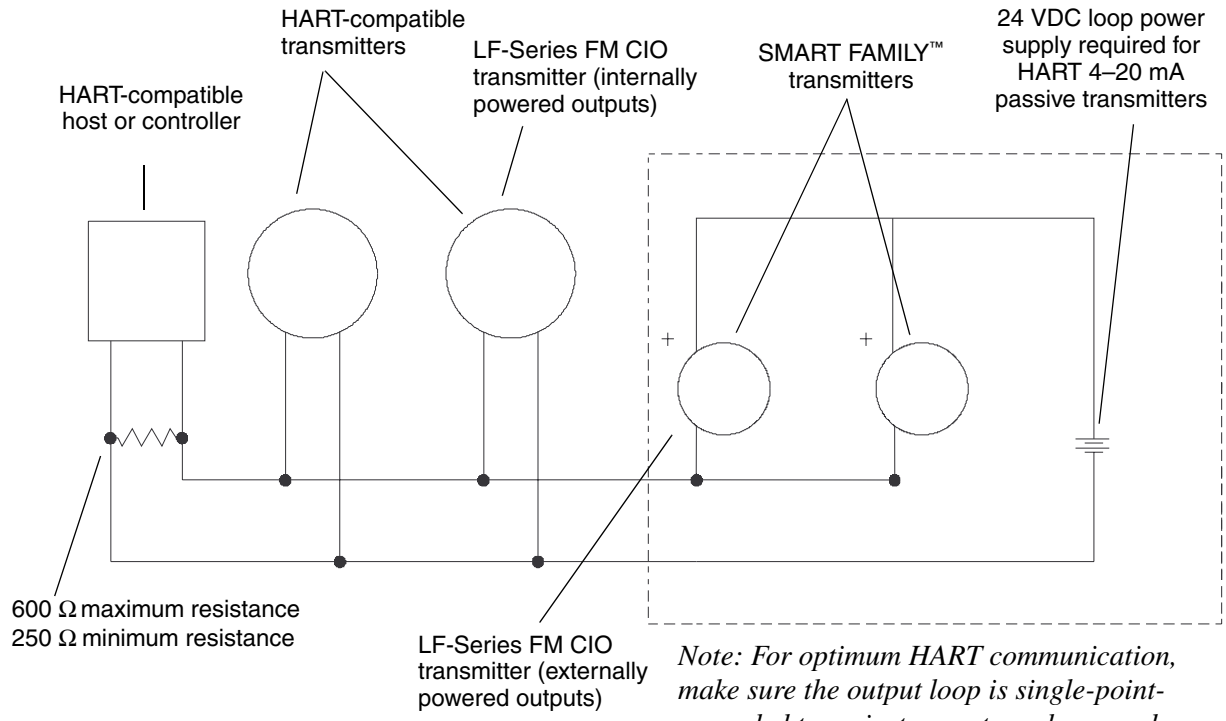


Figure 7-4 HART multidrop wiring with SMART FAMILY™ transmitters and a configuration tool



Note: For optimum HART communication, make sure the output loop is single-point-grounded to an instrument-grade ground.

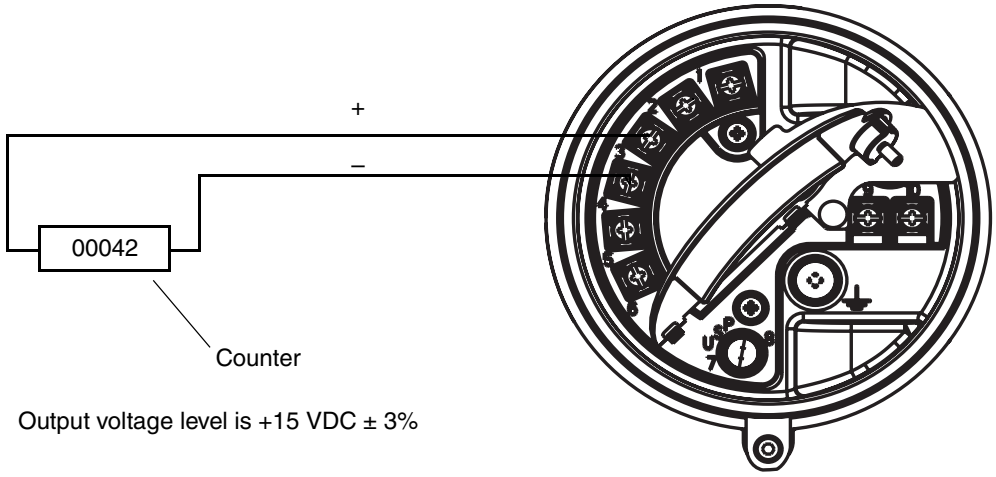
7.4 Frequency output wiring

Frequency output wiring depends on whether you are wiring terminals 3 and 4 (Channel B) or terminals 5 and 6 (Channel C), and also on whether you have configured the terminals for internal or external power. The following diagrams are examples of proper wiring for these configurations:

- Channel B, internal power – Figure 7-5
- Channel B, external power – Figure 7-6
- Channel C, internal power – Figure 7-7
- Channel C, external power – Figure 7-8

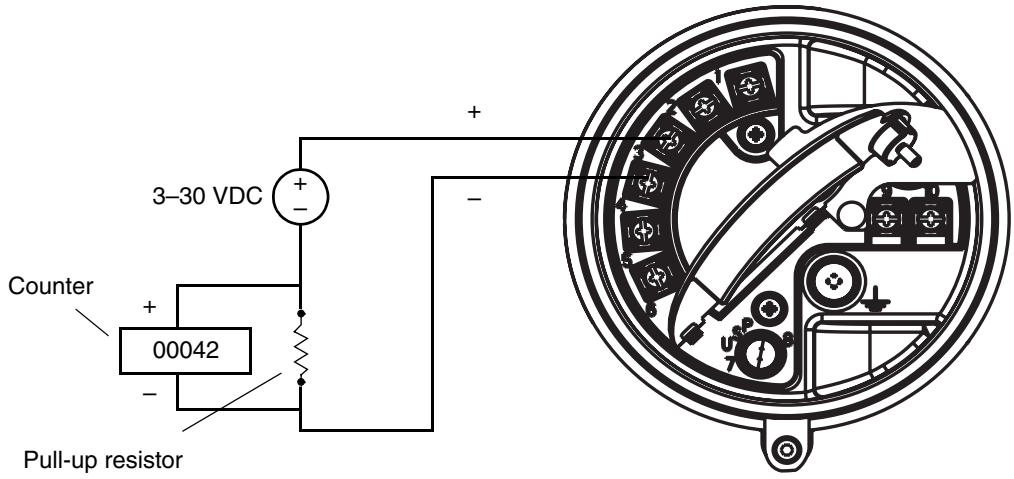
Note: If both Channel B and Channel C are configured for frequency output, the Channel C signal is generated from the Channel B signal, with a user-specified phase shift. The signals are electrically isolated but not independent. This configuration is used to support dual-pulse and quadrature modes. For more information, see the transmitter configuration manual.

Figure 7-5 Frequency output – Terminals 3 & 4 (Channel B) – Internal power



Note: See Figure 7-13 for output voltage versus load resistance.

Figure 7-6 Frequency output – Terminals 3 & 4 (Channel B) – External power



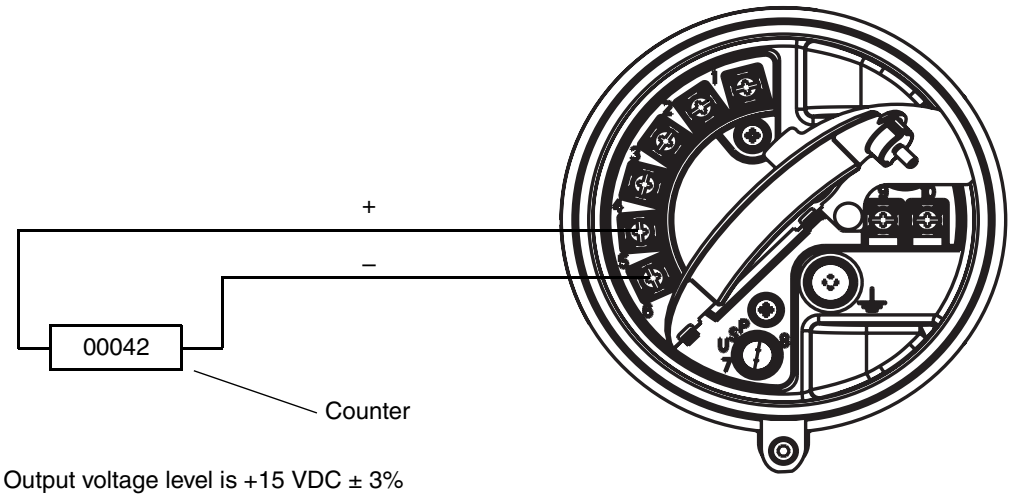
Note: See Figure 7-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

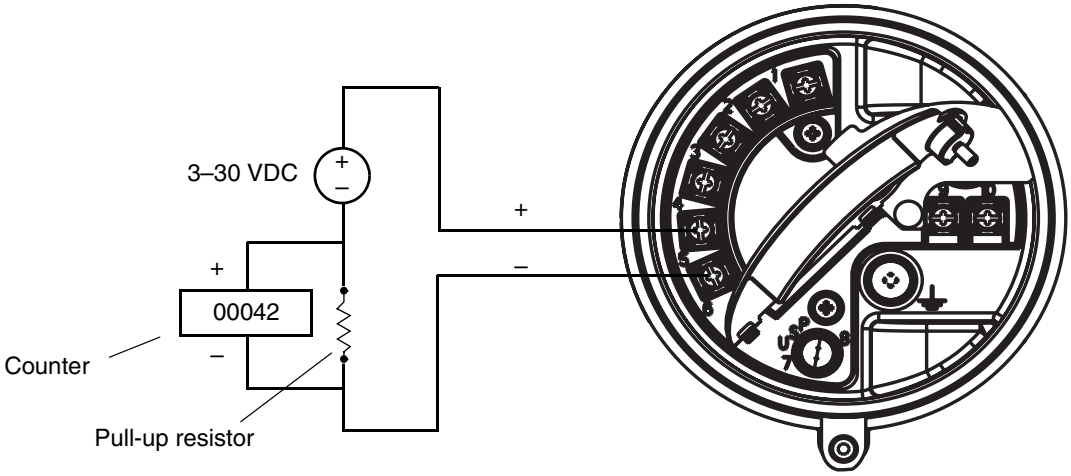
Figure 7-7 Frequency output – Terminals 5 & 6 (Channel C) – Internal power



Output voltage level is +15 VDC ± 3%

Note: See Figure 7-14 for output voltage versus load resistance.

Figure 7-8 Frequency output – Terminals 5 & 6 (Channel C) – External power



Note: Refer to Figure 7-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

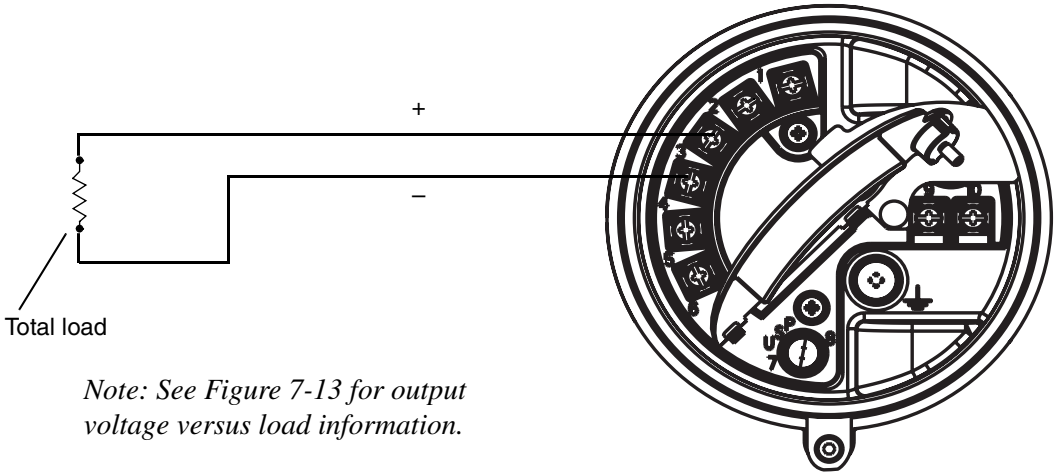
Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

7.5 Discrete output wiring

Discrete output (DO) wiring depends on whether you are wiring terminals 3 and 4 (Channel B) or terminals 5 and 6 (Channel C), and also on whether you have configured the terminals for internal or external power. The following diagrams are examples of proper wiring for these configurations:

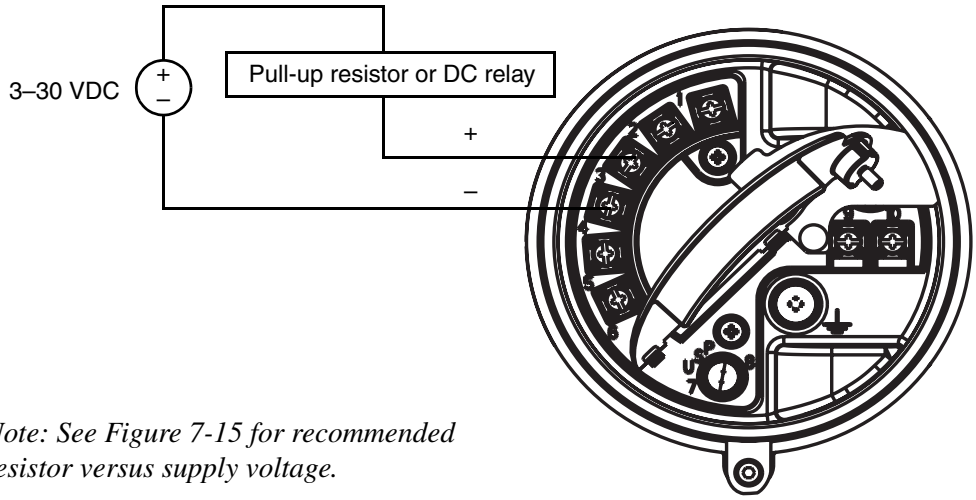
- Channel B, internal power – Figure 7-9
- Channel B, external power – Figure 7-10
- Channel C, internal power – Figure 7-11
- Channel C, external power – Figure 7-12

Figure 7-9 Discrete output 1 – Terminals 3 & 4 (Channel B) – Internal power



Note: See Figure 7-13 for output voltage versus load information.

Figure 7-10 Discrete output 1 – Terminals 3 & 4 (Channel B) – External power



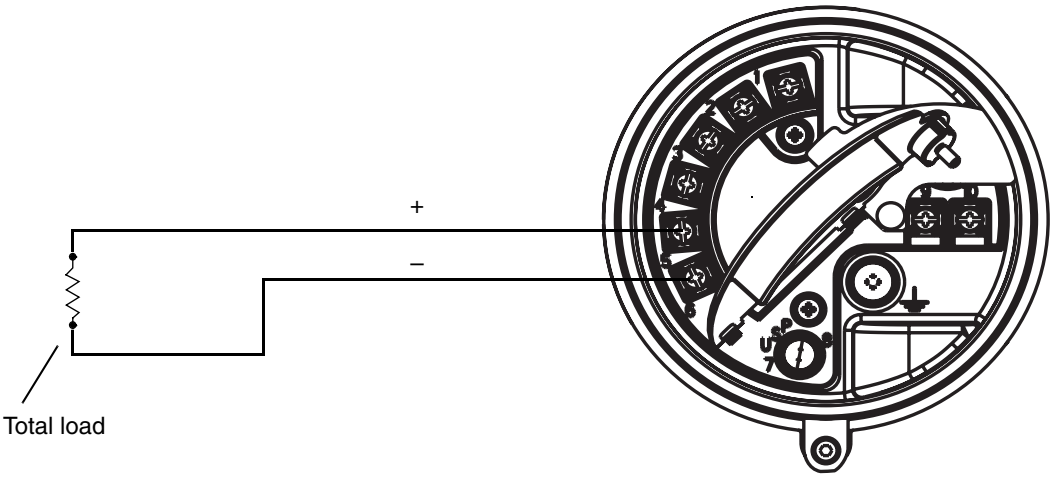
Note: See Figure 7-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

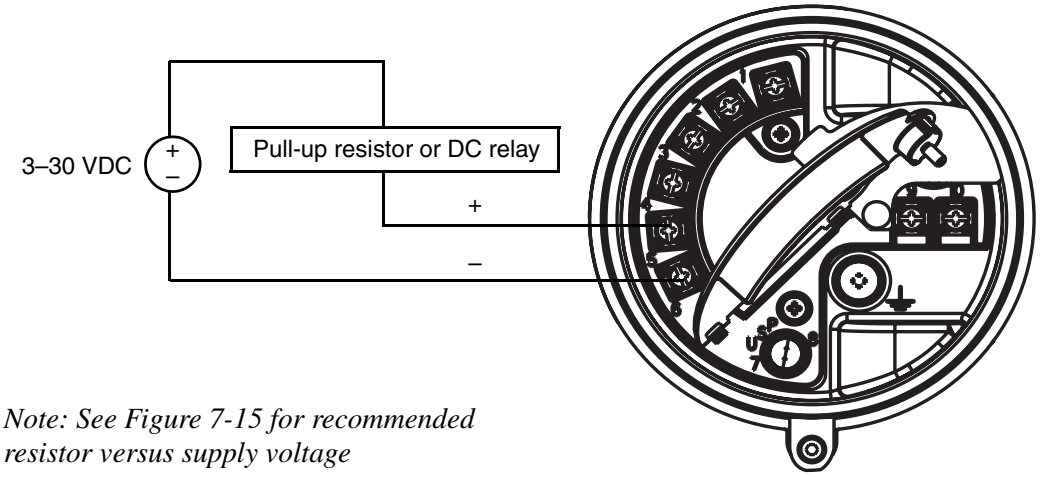
Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

Figure 7-11 Discrete output 2 – Terminals 5 & 6 (Channel C) – Internal power



Note: See Figure 7-14 for output voltage versus load.

Figure 7-12 Discrete output 2 – Terminals 5 & 6 (Channel C) – External power



Note: See Figure 7-15 for recommended resistor versus supply voltage

⚠ CAUTION

Excessive current will damage the transmitter.

Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

Figure 7-13 Output voltage vs. load resistance – Terminals 3 & 4 (Channel B) – Internal power

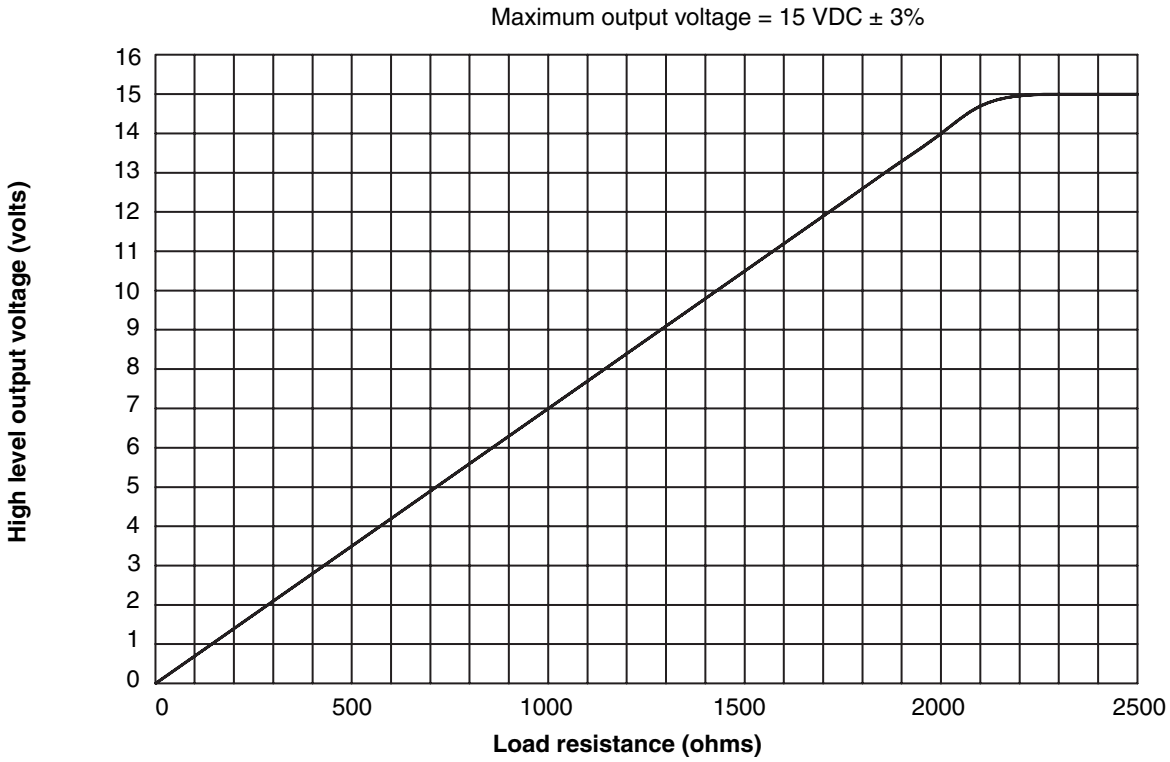


Figure 7-14 Output voltage vs load resistance – Terminals 5 & 6 (Channel C) – Internal power

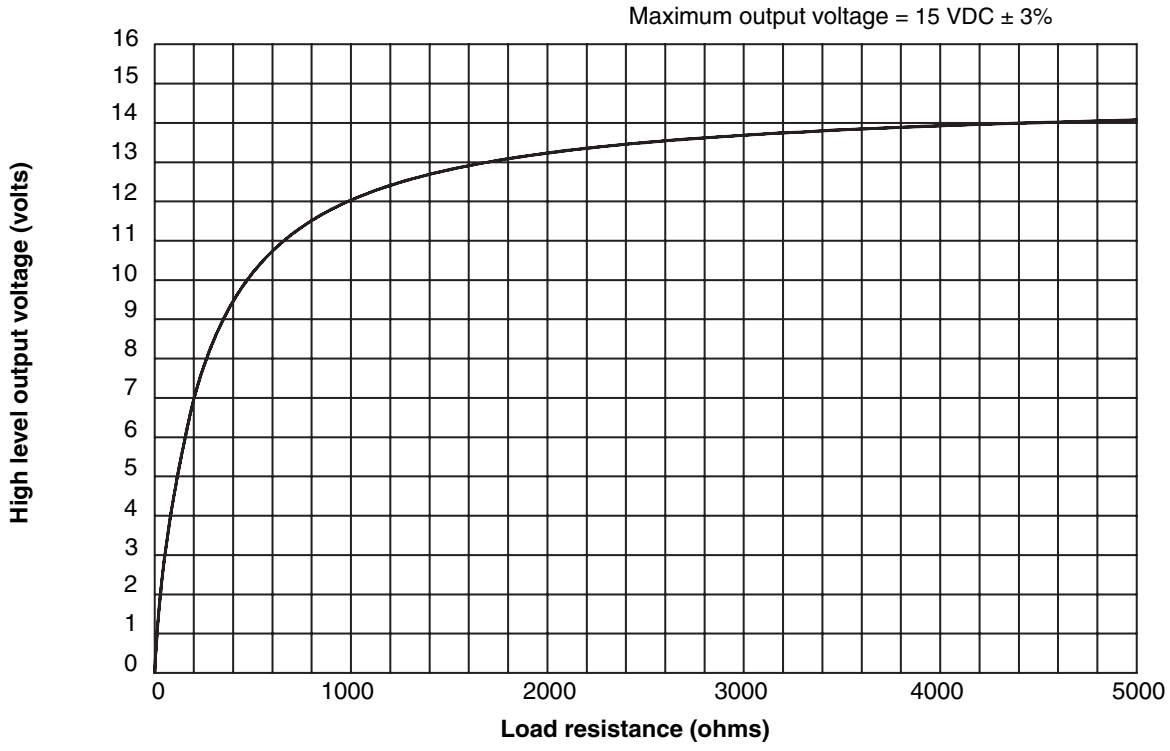
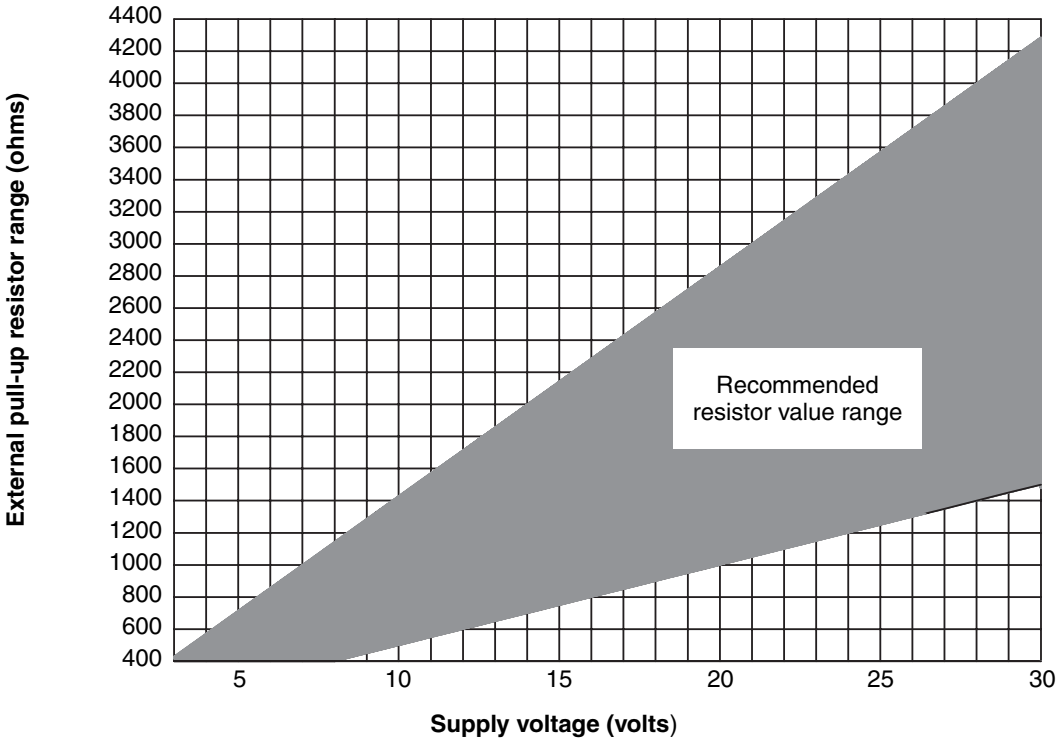


Figure 7-15 Recommended pull-up resistor versus supply voltage – External power



Note: When using a discrete output to drive a relay, choose external pull-up to limit current to less than 500 mA.

7.6 Discrete input wiring

Discrete input wiring depends on whether you have configured terminals 5 and 6 (Channel C) for internal or external power. The following diagrams are examples of proper wiring for these configurations.

If external power is configured, power may be supplied by a PLC or other device, or by direct DC input. See Table 7-2 for input voltage ranges.

Table 7-2 Input voltage ranges for external power

VDC	Range
3–30	High level
0–0.8	Low level
0.8–3	Undefined

Figure 7-16 Discrete input – Terminals 5 & 6 (Channel C) – Internal power

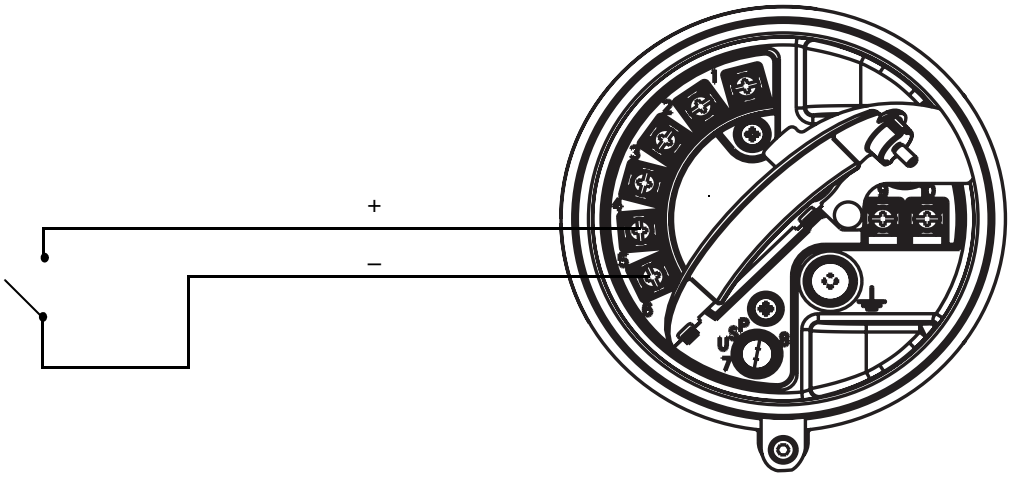
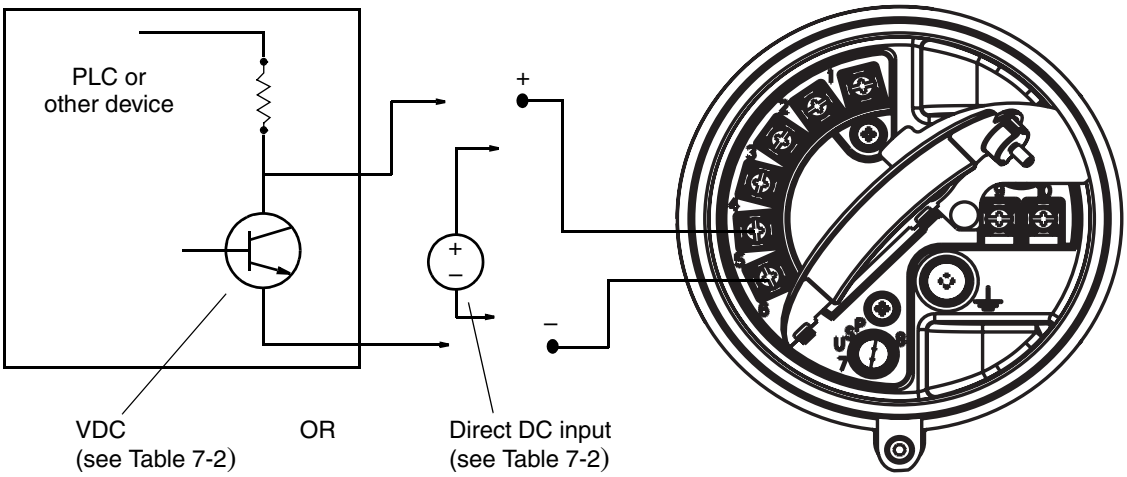


Figure 7-17 Discrete input – Terminals 5 & 6 (Channel C) – External power



Chapter 8
I/O Wiring – FM FB and PA Transmitters

8.1 Overview

This chapter explains how to connect communication wires for LF-Series field-mount transmitters with the FOUNDATION fieldbus or Profibus-PA outputs option board. If you don't know your transmitter type, see Section 1.6.

It is the user's responsibility to verify that the specific installation meets the local and national safety requirements and electrical codes.

8.2 FOUNDATION fieldbus wiring

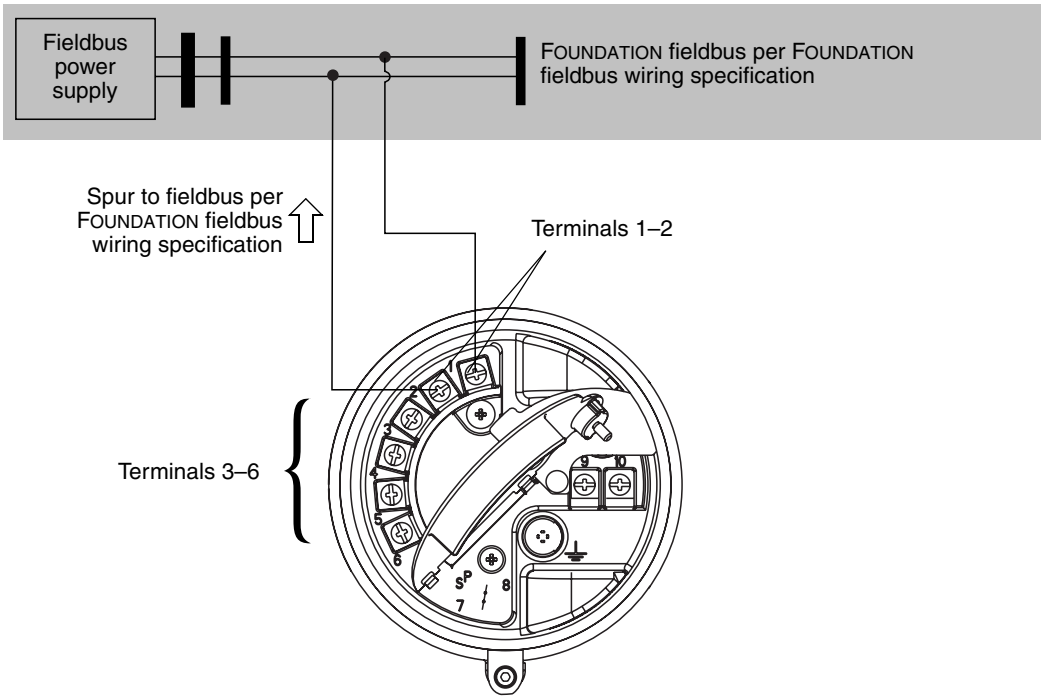
Connect the communication wires according to the diagram in Figure 8-1. Follow all local safety regulations.

⚠ WARNING

A transmitter that has been improperly wired or installed in a hazardous area could cause an explosion.

- Make sure the transmitter is wired to meet or exceed local code requirements.
- Install the transmitter in an environment that complies with the hazardous area approval tag on the transmitter. See Appendix A.

Figure 8-1 Connecting the fieldbus communication wires



Note: Terminals 3 through 6 are not used.

Note: The fieldbus communication terminals (1 and 2) are polarity-insensitive.

8.3 Profibus-PA wiring

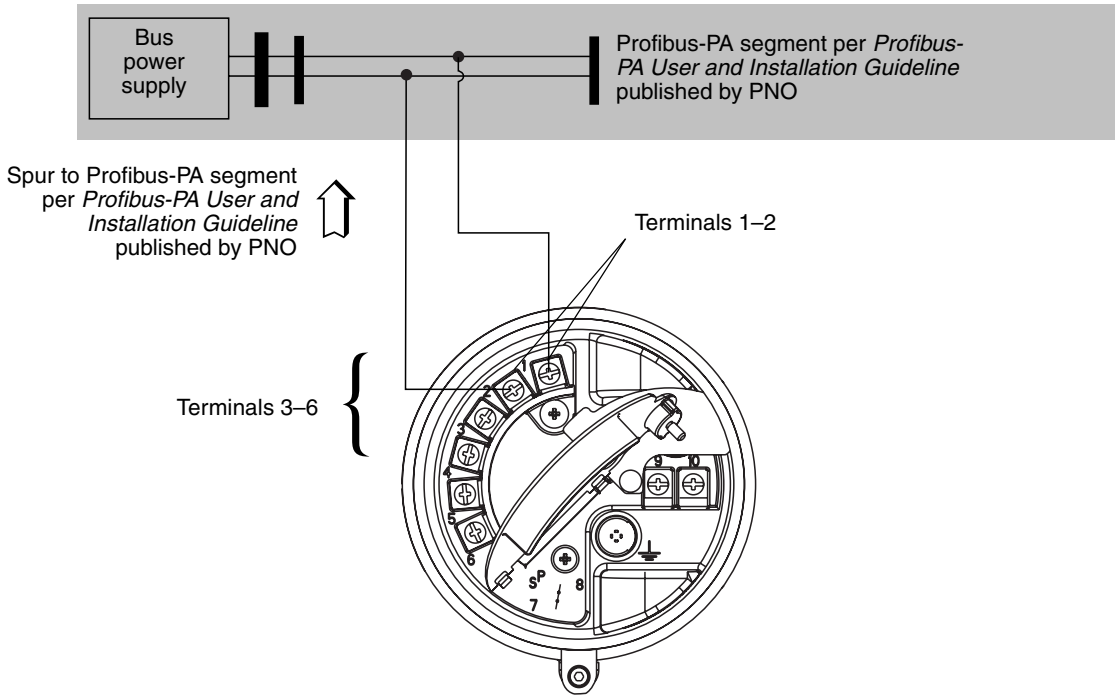
Wire the transmitter to the Profibus-PA segment according to the diagram in Figure 8-2. Follow all local safety regulations.

⚠ WARNING

A transmitter that has been improperly wired or installed in a hazardous area could cause an explosion.

- Make sure the transmitter is wired to meet or exceed local code requirements.
- Install the transmitter in an environment that complies with the hazardous area approval tag on the transmitter. See Appendix A.

Figure 8-2 Connecting the Profibus-PA communication wires



Note: Terminals 3 through 6 are not used.

Note: The Profibus communication terminals (1 and 2) are polarity-insensitive.

Note: If you want intrinsically safe wiring, see the Profibus-PA User and Installation Guide *published by PNO.*

Chapter 9
I/O Wiring – DIN AN Transmitters

9.1 Overview

This chapter describes how to wire the outputs for LF-Series DIN AN transmitters. If you don't know your transmitter type, see Section 1.6.

It is the user's responsibility to verify that the specific installation meets the local and national safety requirements and electrical codes.

9.2 Transmitter outputs

Table 9-1 describes the outputs and communication protocols available for the LF-Series DIN rail mount AN transmitter.

Note: The term "channel" is used to refer to the output terminal pairs.

Table 9-1 Terminals, channels, and output types

Terminals	Channel	Output type	Communication
21 & 22	A	Milliamp	HART/Bell202
23 & 24	B	Not used	None
31 & 32	C	Frequency	None
33 & 34	N/A	Digital	Modbus/RS-485

9.2.1 mA output wiring

The following wiring diagrams are examples of proper wiring for the mA output on the LF-Series DIN rail mount AN transmitter. The following options are shown:

- Basic mA output wiring – Figure 9-1
- HART/analog single-loop wiring – Figure 9-2
- HART multidrop wiring – Figure 9-3

Figure 9-1 Basic mA output wiring

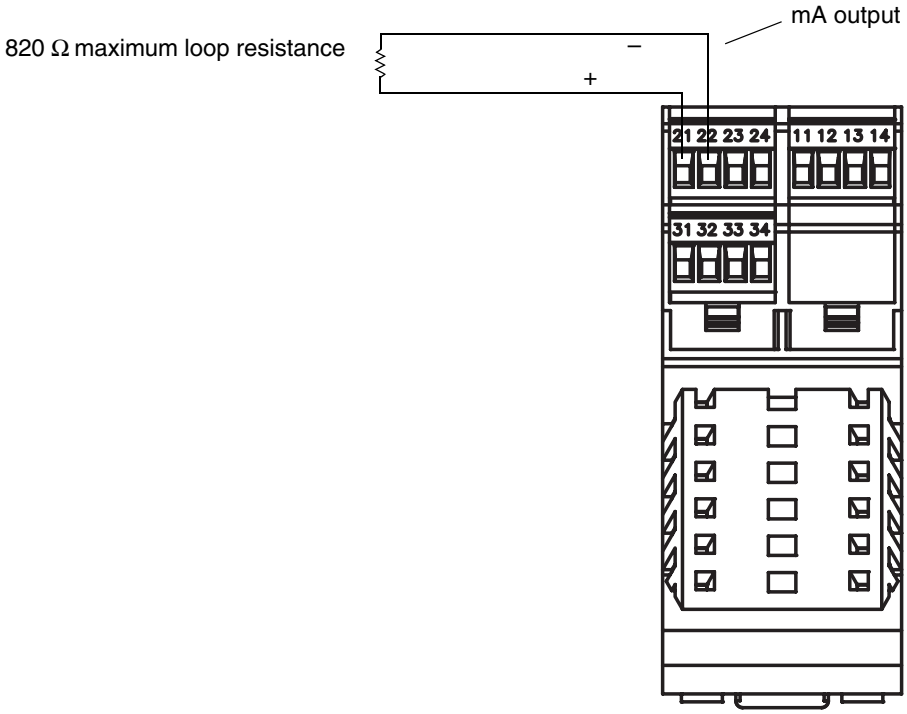


Figure 9-2 HART/analog single-loop wiring

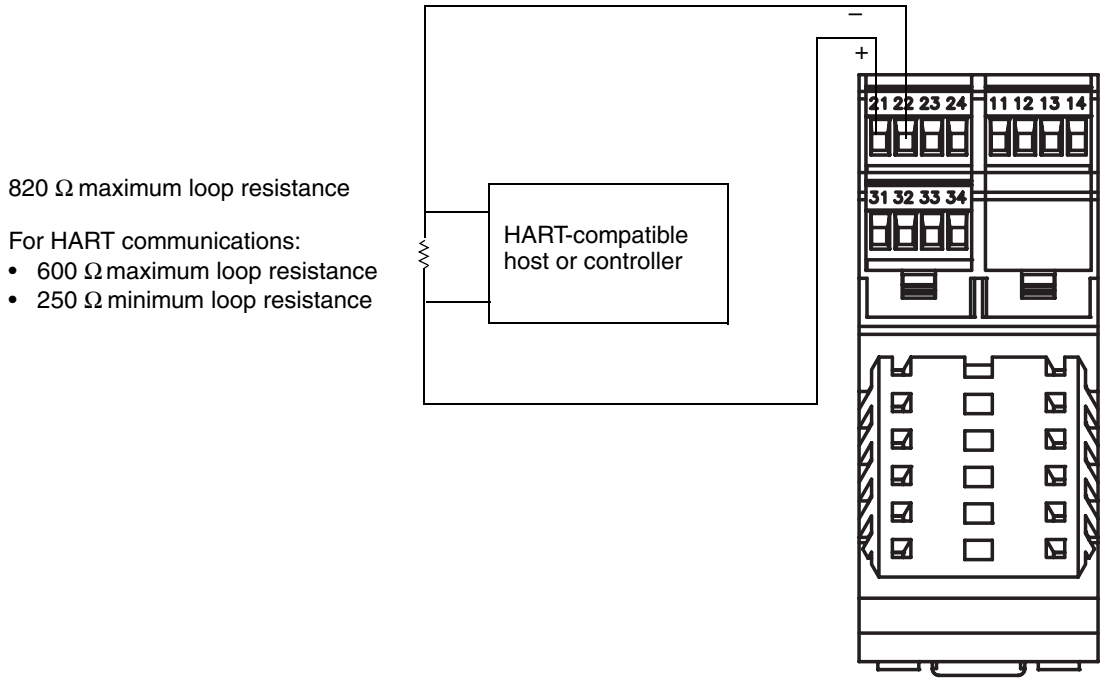
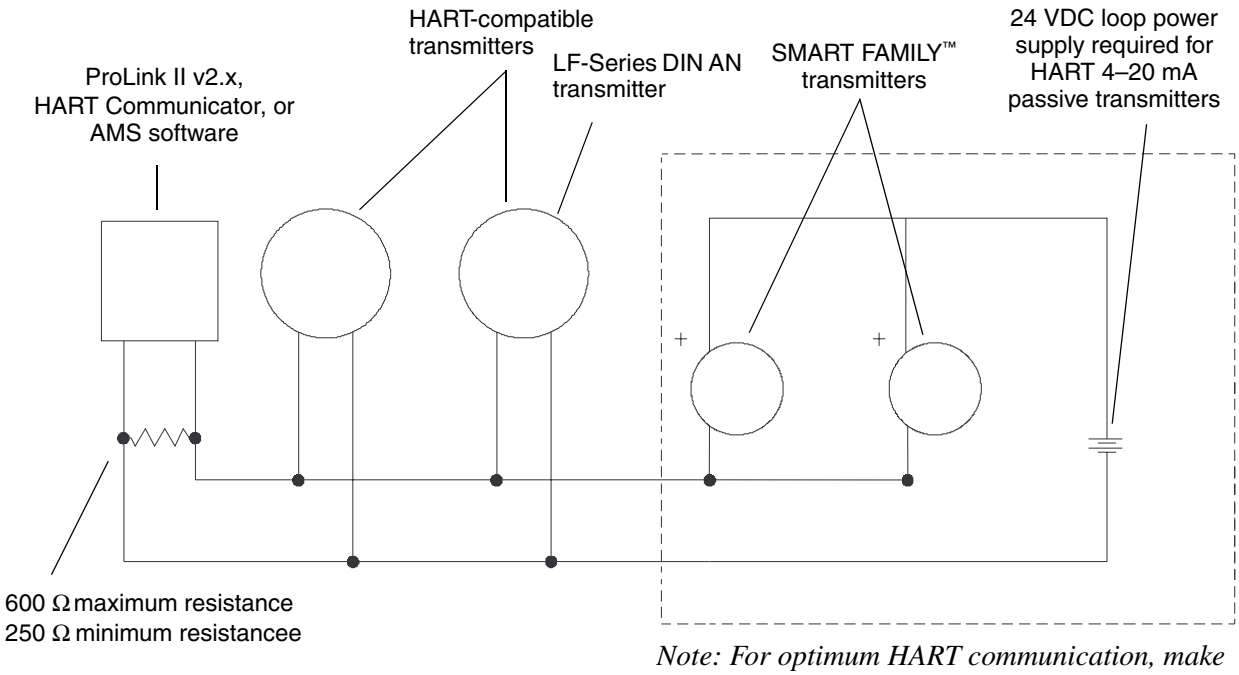


Figure 9-3 HART multidrop wiring with SMART FAMILY™ transmitters and a configuration tool

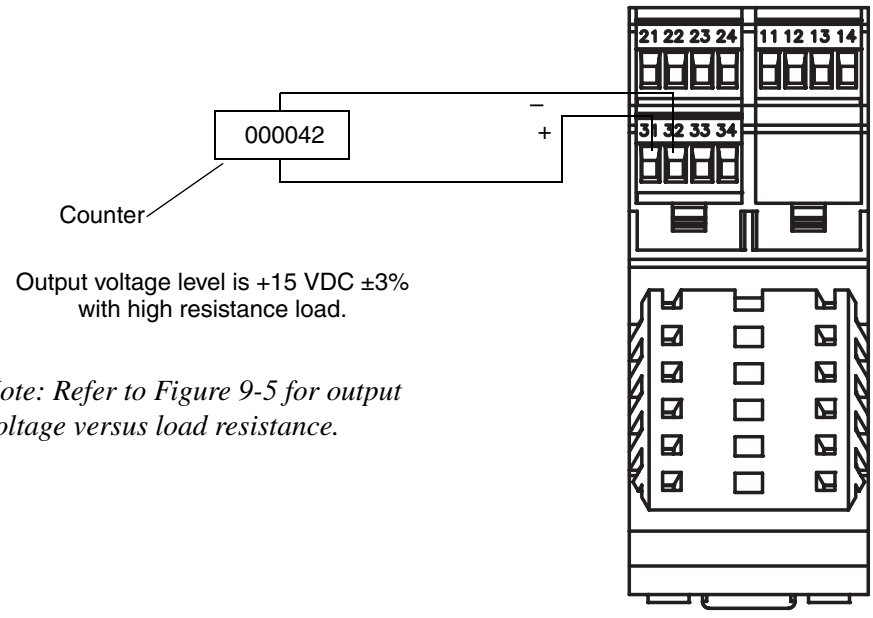


Note: For optimum HART communication, make sure the output loop is single-point-grounded to an instrument-grade ground.

9.2.2 Frequency output wiring

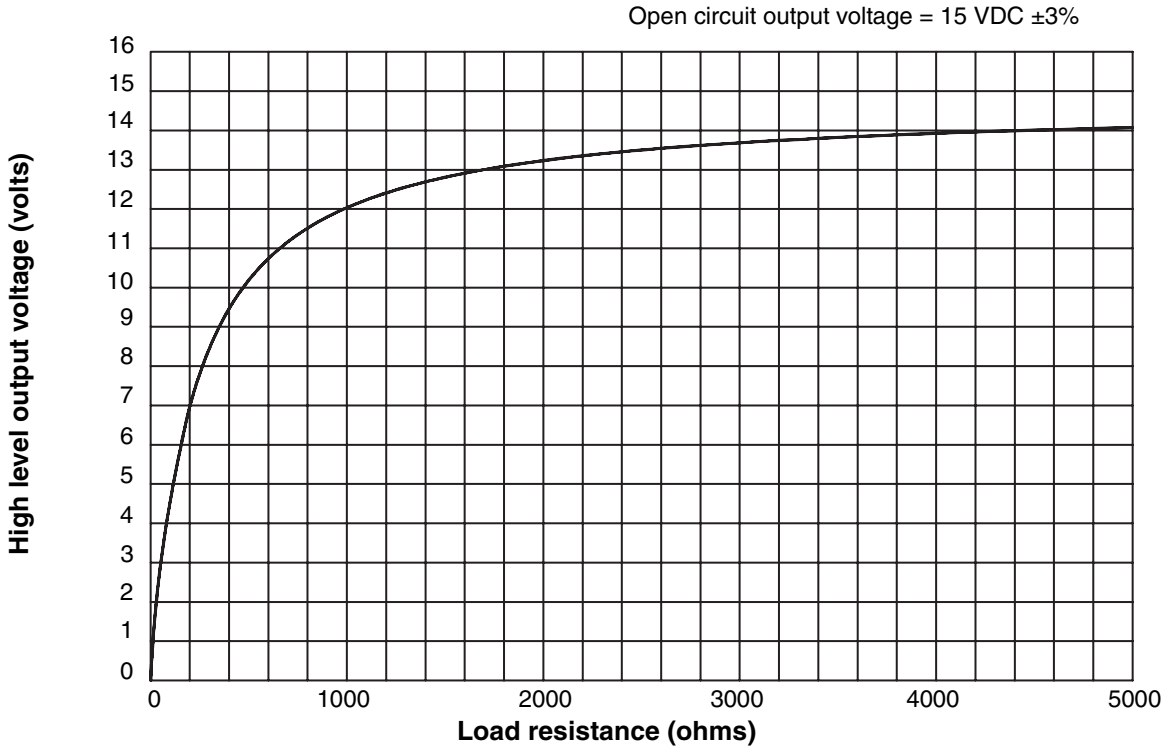
Figure 9-4 shows an example of proper wiring for the frequency output on the LF-Series DIN AN transmitter.

Figure 9-4 Basic frequency output wiring



Note: Refer to Figure 9-5 for output voltage versus load resistance.

Figure 9-5 Frequency output wiring – Output voltage versus load resistance



9.2.3 Wiring to a remote host

Terminals 33 and 34 support Modbus/RS-485 communication with a remote host. For an example of wiring, see Figure 9-6. For terminal information, see Table 9-2.

Figure 9-6 Wiring to a remote host

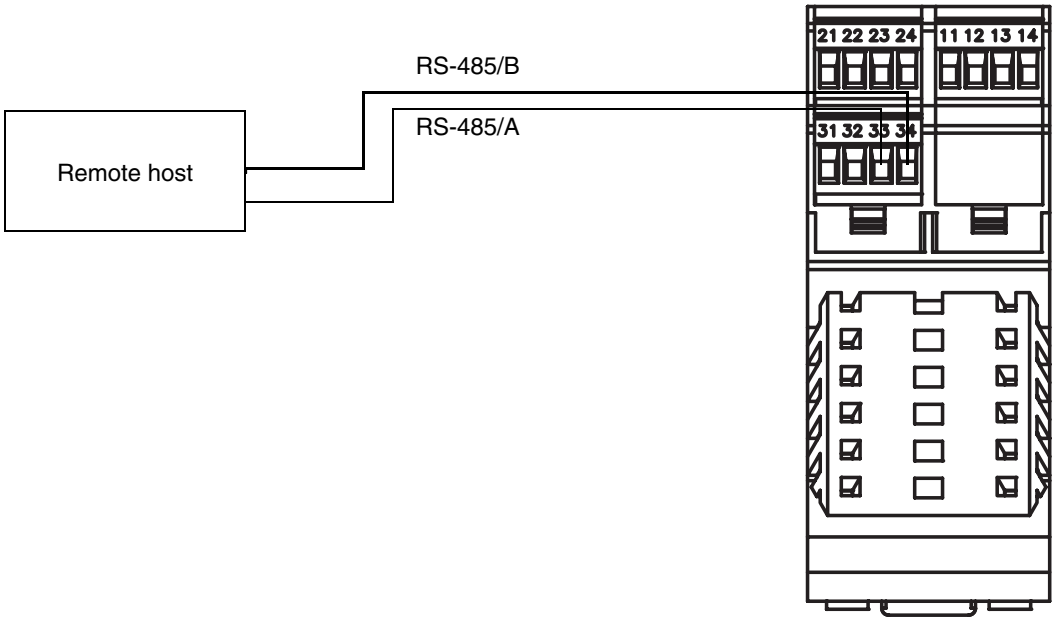


Table 9-2 Wire terminal assignments for Modbus/RS-485

RS-485 signal	Transmitter terminal
A	33
B	34

Chapter 10
I/O Wiring – DIN CIO Transmitters

10.1 Overview

This chapter describes how to wire the inputs and outputs for LF-Series DIN CIO transmitters. If you don't know your transmitter type, see Section 1.6.

It is the user's responsibility to verify that the specific installation meets the local and national safety requirements and electrical codes.

10.2 Channel configuration

The six output terminals are divided into three pairs. The pairs are called Channels A, B, and C. Channel A is terminals 21 and 22; Channel B is terminals 23 and 24; and Channel C is terminals 31 and 32. Variable assignments are governed by channel configuration.

Output wiring requirements depend on how you will configure the transmitter terminals. The configuration options are shown in Table 10-1 and Figure 10-1. You can use ProLink II software to configure the channels. See the transmitter configuration manual for more information.

If Channel B is configured as a frequency output or discrete output, it can also be configured to use either internal or external power. Channel C can be configured to use either internal or external power, independent of its output configuration.

- "Internal power" means that the terminals are powered automatically by the transmitter. The output wiring instructions do not include power setup and power wiring.
- "External power" means that the terminals must be connected to an independent power supply. The output wiring instructions include power setup and power wiring.

Note: The terms "active" and "passive" are sometimes used to describe internally and externally powered outputs.

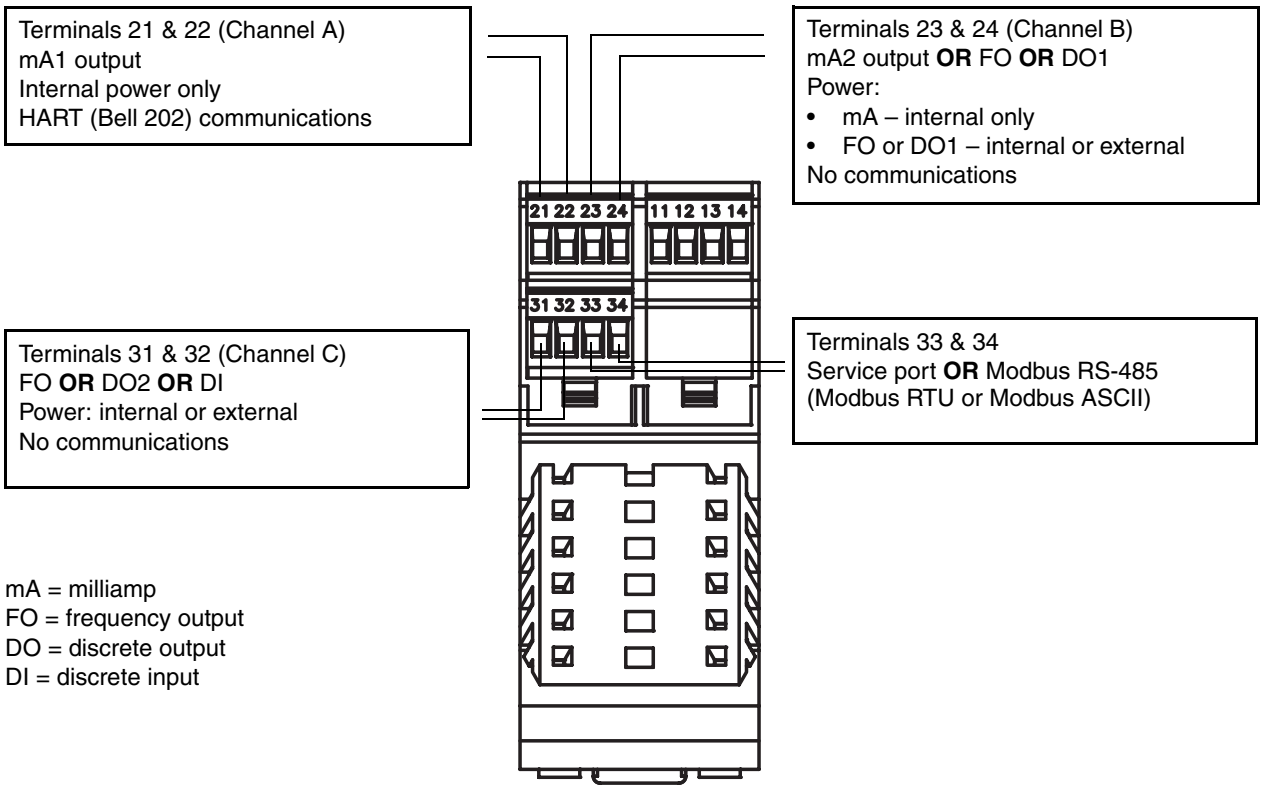
Note: You cannot configure the following combination: Channel B = discrete output, Channel C = frequency output. If you need both a frequency output and a discrete output, use the following: Channel B = frequency output, Channel C = discrete output. For more information, see the transmitter configuration manual.

Table 10-1 Channel configuration

Channel	Terminals	Configuration options	Power
A	21 & 22	mA output with HART/Bell 202(1)	Internal
B	23 & 24	• mA output (default)	Internal
		• Frequency output(2)	Internal or external(3)
		• Discrete output(4)	Internal or external(3)
C	31 & 32	• Frequency output (default)(5)	Internal or external(3)
		• Discrete output	Internal or external(3)
		• Discrete input	Internal or external(3)
D	33 & 34	Modbus/RS-485	Internal

(1) The Bell 202 signal is superimposed on the mA output.
(2) Can be configured for active high or active low polarity. Default is active high.
(3) You must provide power to the outputs when a channel is set to external power.
(4) Because discrete output 1 uses the same circuitry as the frequency output, it is not possible to configure both a frequency ouput and discrete output 1. If both a frequency output and a discrete output are required, configure Channel B as the frequency output and Channel C as the discrete output (discrete output 2).
(5) When configured for two frequency outputs (dual pulse), frequency output 2 is generated from the same signal that is sent to the first frequency output. Frequency output 2 is electrically isolated but not independent.

Figure 10-1 Configuration of configurable I/O terminals



10.3 mA output wiring

The wiring diagrams in this section are examples of proper wiring for the LF-Series DIN CIO transmitter's primary and secondary mA outputs. The following options are shown:

- Basic mA output wiring – Figure 10-2
- HART/analog single-loop wiring – Figure 10-3
- HART multidrop wiring – Figure 10-4

Figure 10-2 Basic mA output wiring

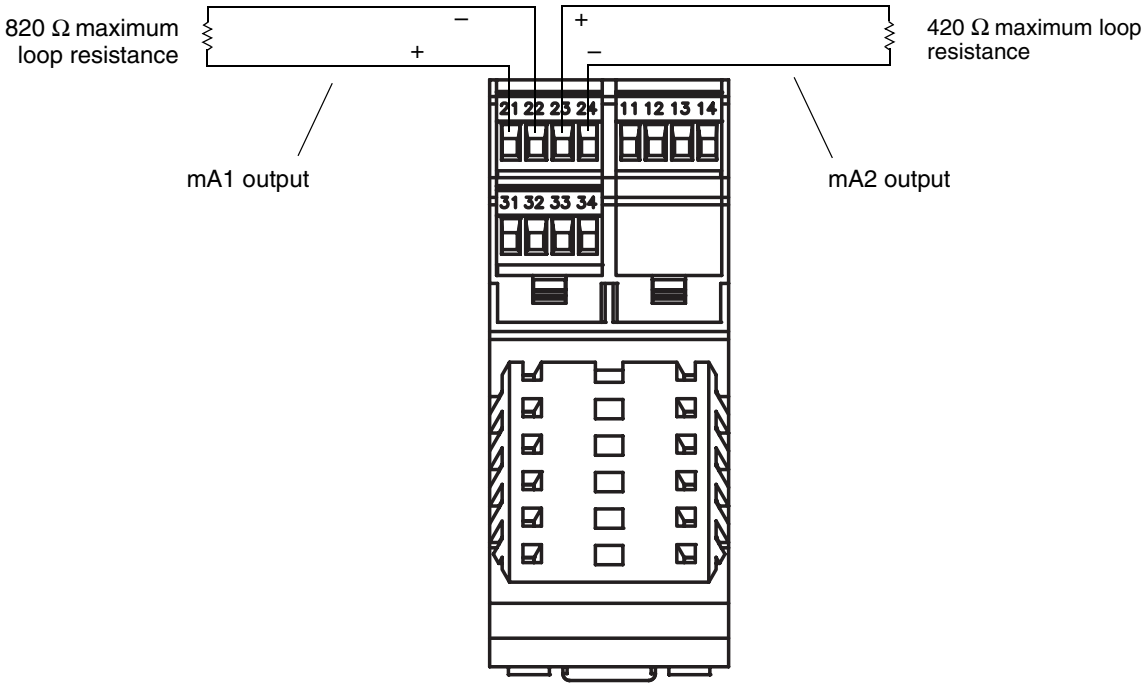


Figure 10-3 HART/analog single-loop wiring

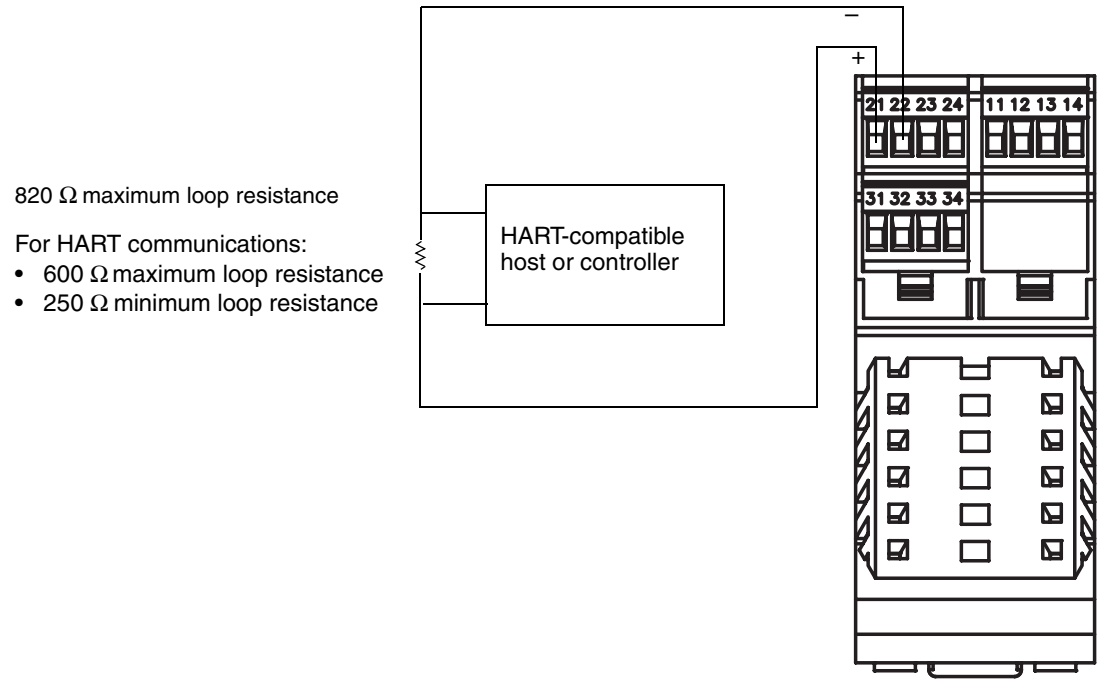
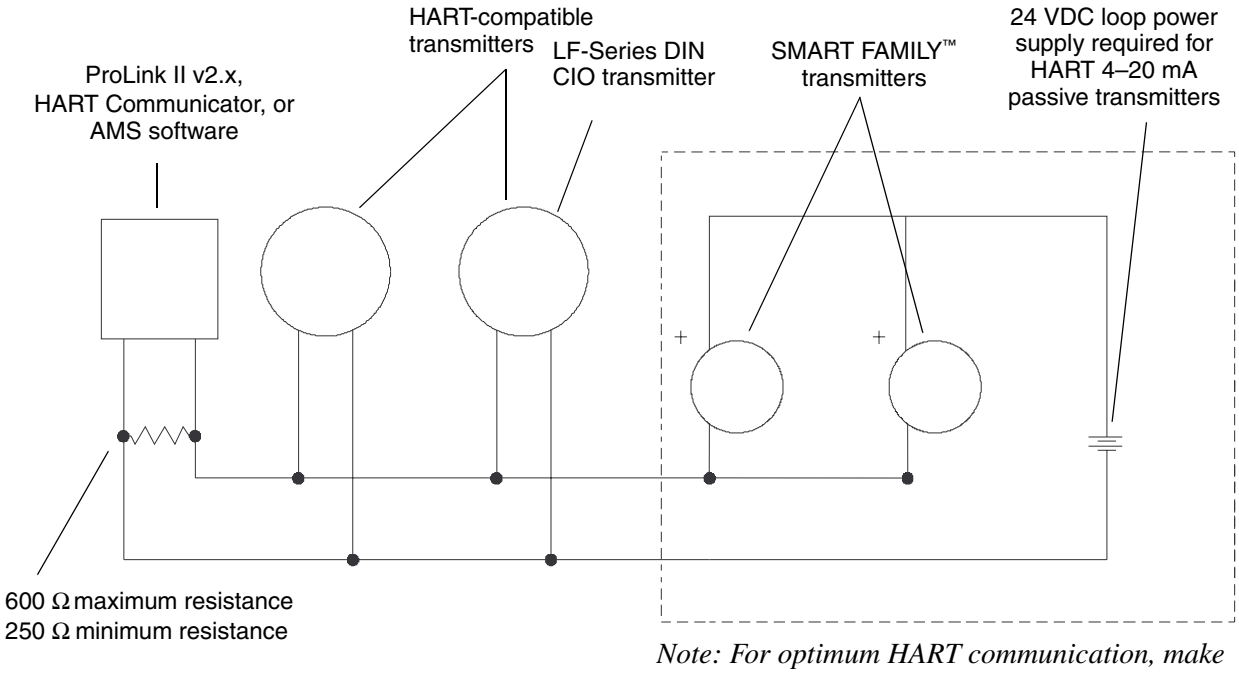


Figure 10-4 HART multidrop wiring with SMART FAMILY™ transmitters and a configuration tool



Note: For optimum HART communication, make sure the output loop is single-point-grounded to an instrument-grade ground.

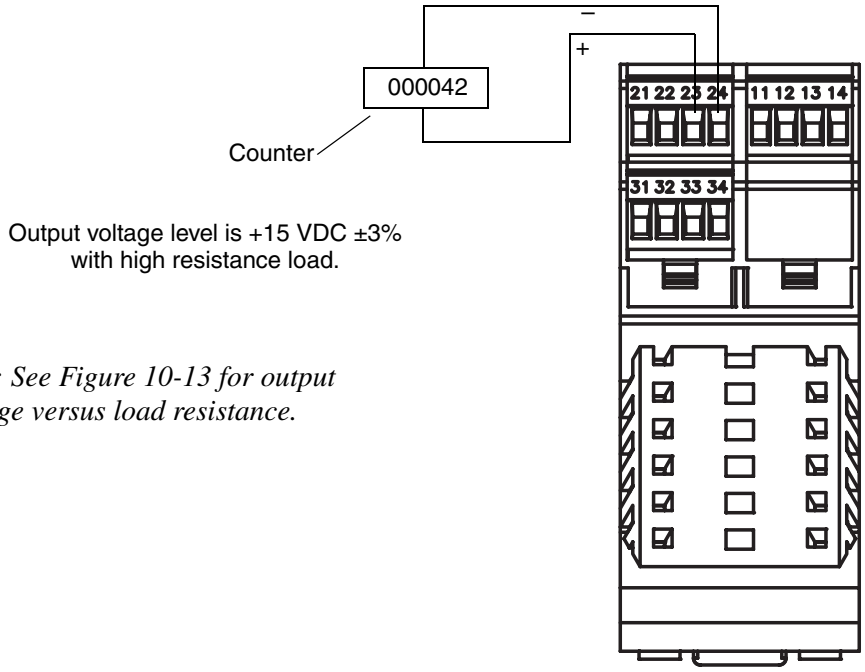
10.4 Frequency output wiring

Frequency output wiring depends on whether you are wiring terminals 23 and 24 (Channel B) or terminals 31 and 32 (Channel C), and also on whether you have configured the terminals for internal or external power. The following diagrams are examples of proper wiring for these configurations:

- Channel B, internal power – Figure 10-5
- Channel B, external power – Figure 10-6
- Channel C, internal power – Figure 10-7
- Channel C, external power – Figure 10-8

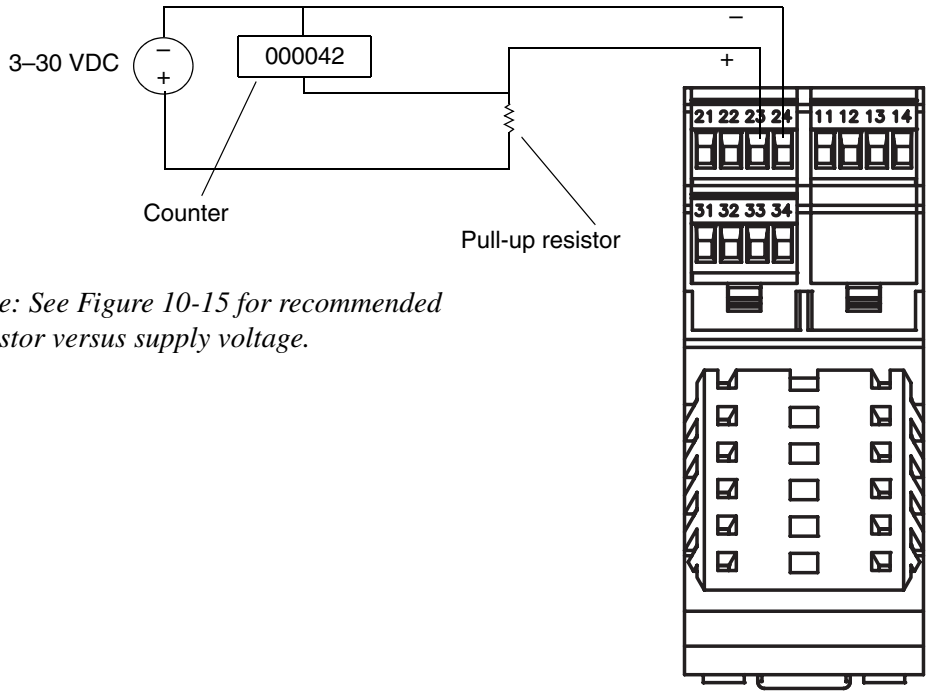
Note: If both Channel B and Channel C are configured for frequency output, the Channel C signal is generated from the Channel B signal, with a user-specified phase shift. The signals are electrically isolated but not independent. This configuration is used to support dual-pulse and quadrature modes. See the transmitter configuration manual.

Figure 10-5 Frequency output wiring – Terminals 23 & 24 (Channel B) – Internal power



Note: See Figure 10-13 for output voltage versus load resistance.

Figure 10-6 Frequency output wiring – Terminals 23 & 24 (Channel B) – External power



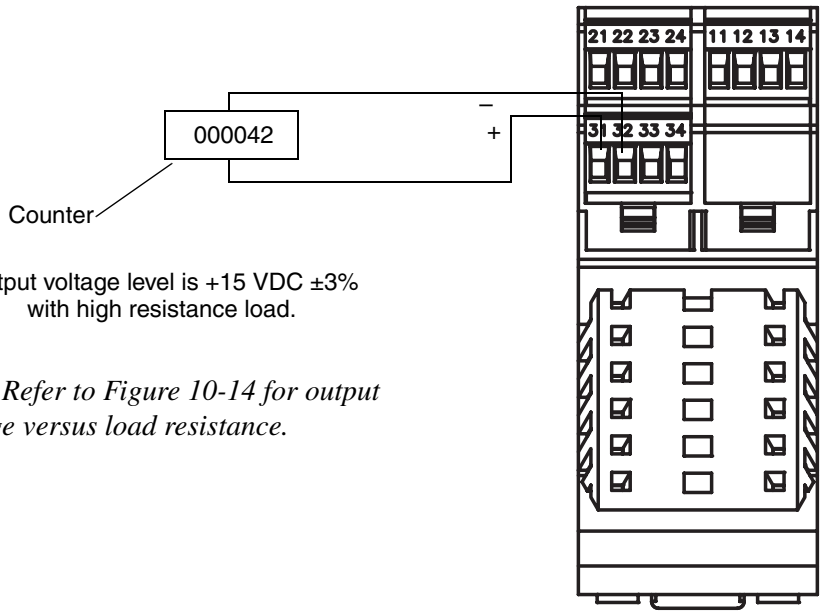
Note: See Figure 10-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

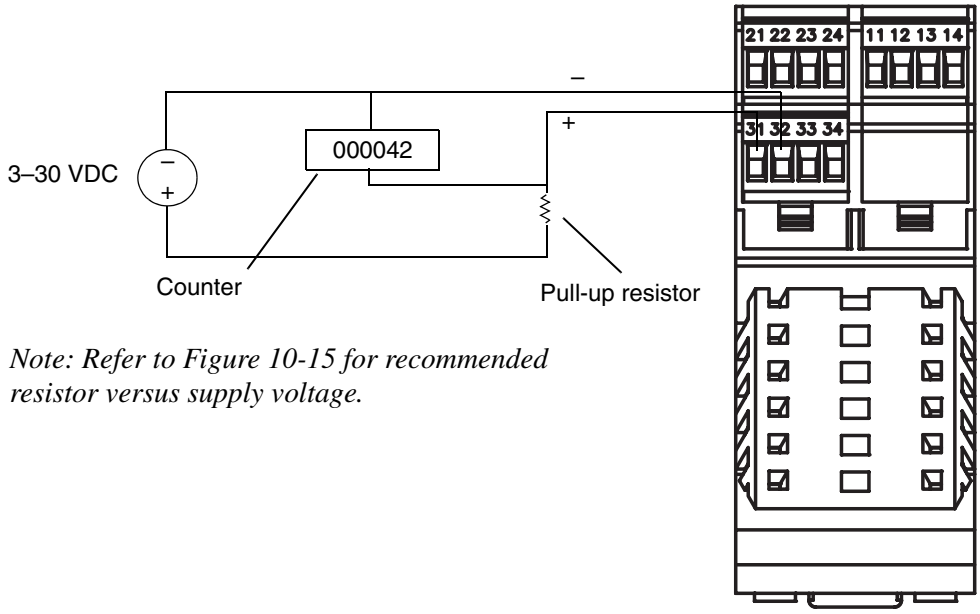
Figure 10-7 Frequency output wiring – Terminals 31 & 32 (Channel C) – Internal power



Output voltage level is +15 VDC ±3% with high resistance load.

Note: Refer to Figure 10-14 for output voltage versus load resistance.

Figure 10-8 Frequency output wiring – Terminals 31 & 32 (Channel C) – External power



Note: Refer to Figure 10-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

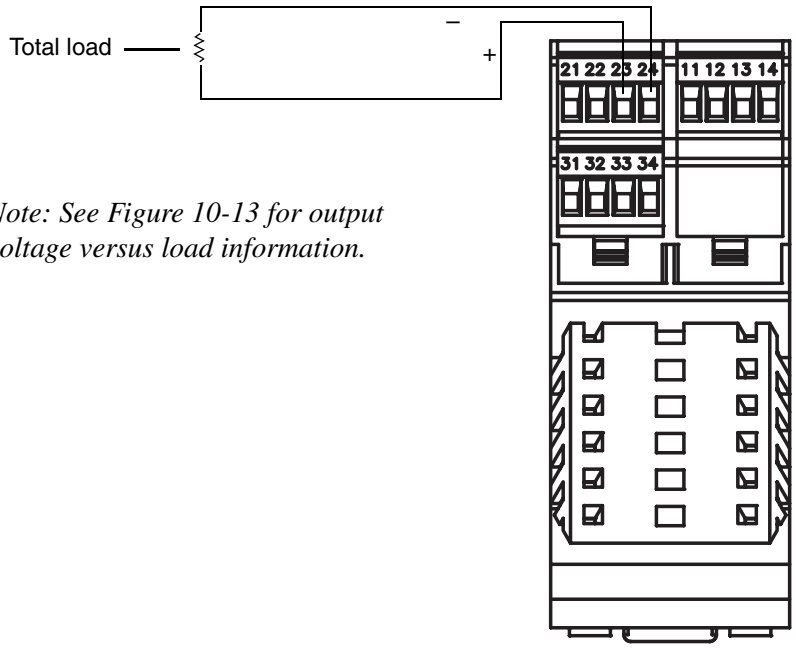
Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

10.5 Discrete output wiring

Discrete output wiring depends on whether you are wiring terminals 23 and 24 (Channel B) or terminals 31 and 32 (Channel C), and also on whether you have configured the terminals for internal or external power. The following diagrams are examples of proper wiring for these configurations:

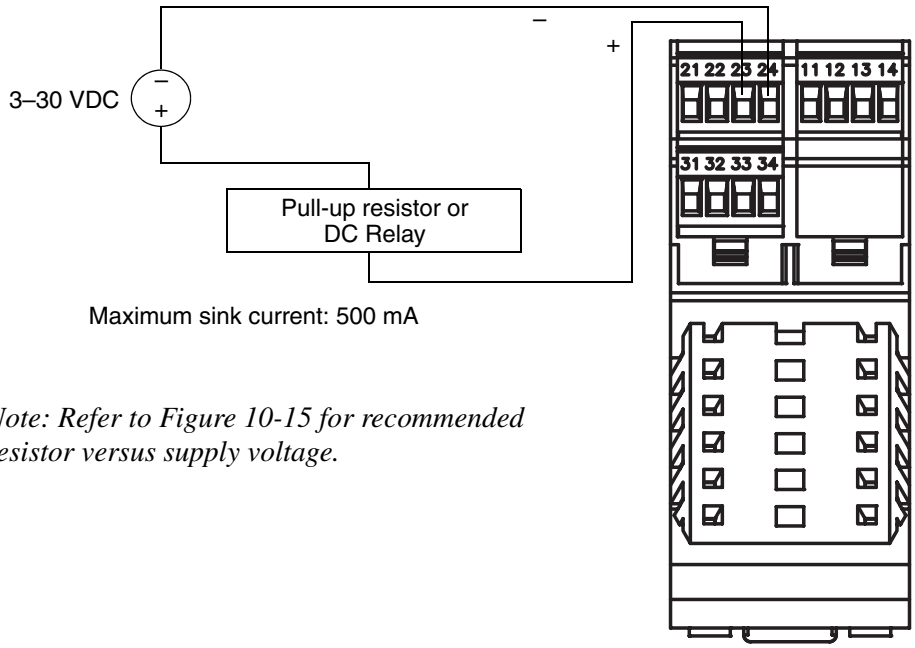
- Channel B (DO1), internal power – Figure 10-9
- Channel B (DO1), external power – Figure 10-10
- Channel C (DO2), internal power – Figure 10-11
- Channel C (DO2), external power – Figure 10-12

Figure 10-9 Discrete output 1 wiring – Terminals 23 & 24 (Channel B) – Internal power



Note: See Figure 10-13 for output voltage versus load information.

Figure 10-10 Discrete output 1 wiring – Terminals 23 & 24 (Channel B) – External power



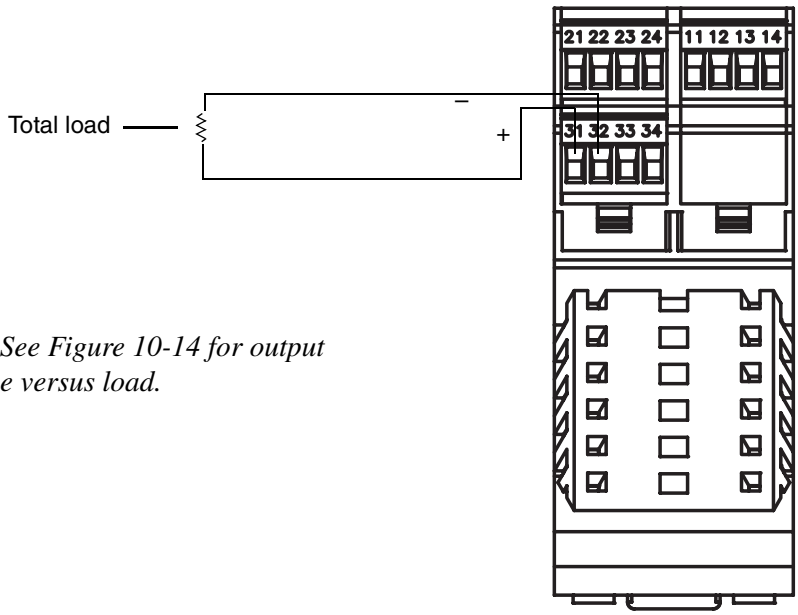
Note: Refer to Figure 10-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

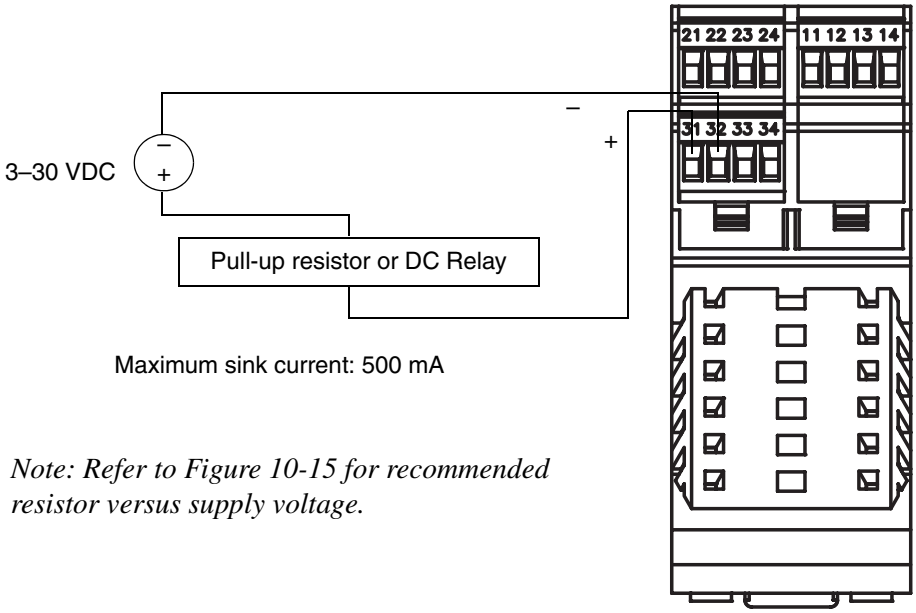
Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

Figure 10-11 Discrete output 2 wiring – Terminals 31 & 32 (Channel C) – Internal power



Note: See Figure 10-14 for output voltage versus load.

Figure 10-12 Discrete output 2 wiring – Terminals 31 & 32 (Channel C) – External power



Note: Refer to Figure 10-15 for recommended resistor versus supply voltage.

⚠ CAUTION

Excessive current will damage the transmitter.

Do not exceed 30 VDC input. Terminal current must be less than 500 mA.

Figure 10-13 Output voltage vs. load resistance – Terminals 23 & 24 (Channel B) – Internal power

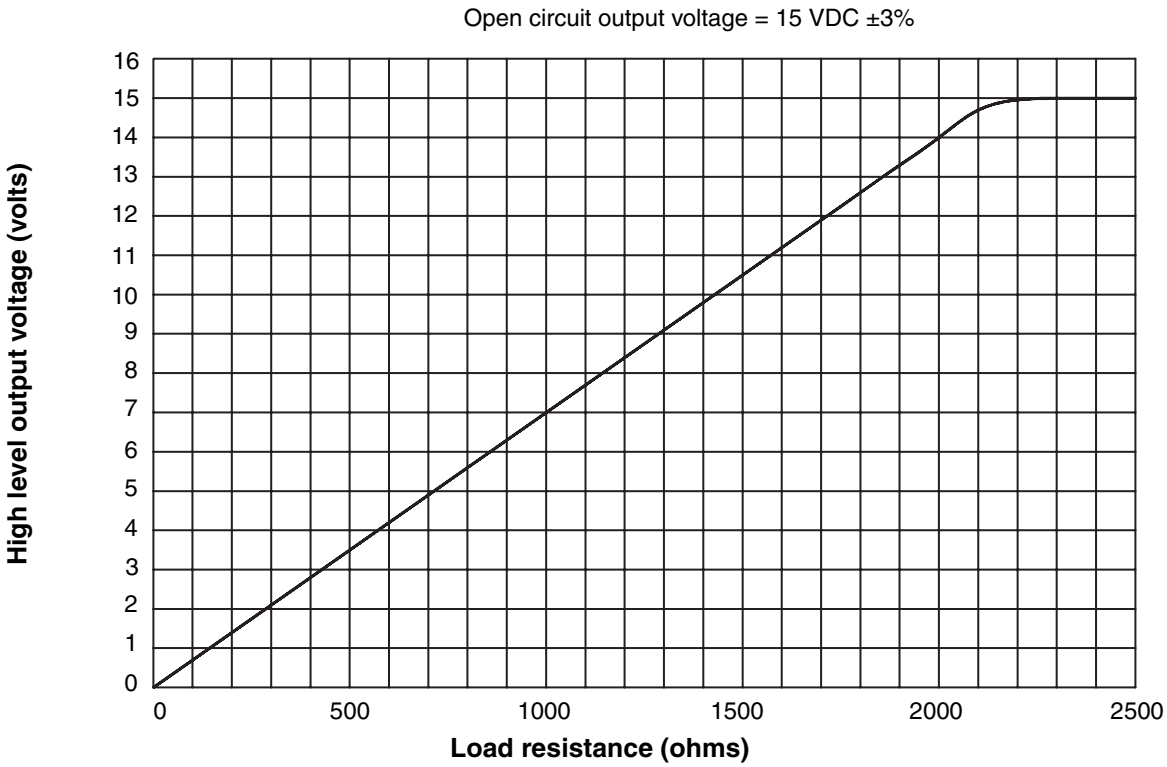


Figure 10-14 Output voltage vs load resistance – Terminals 31 & 32 (Channel C) – Internal power

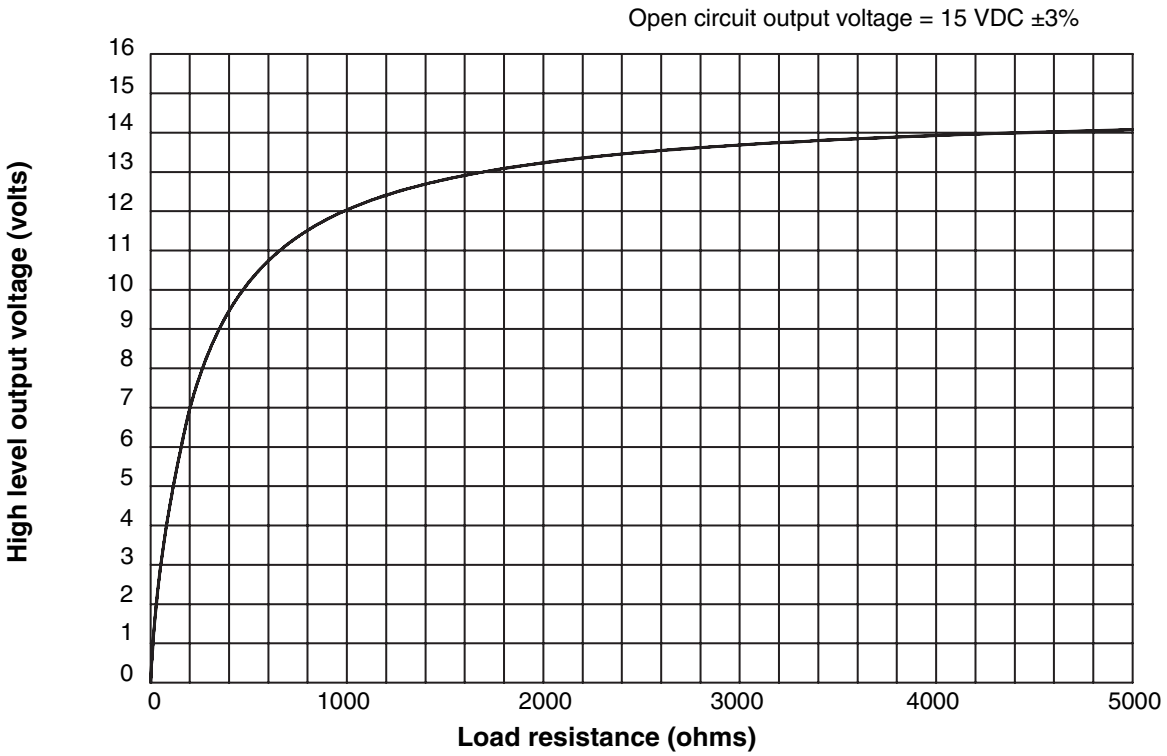
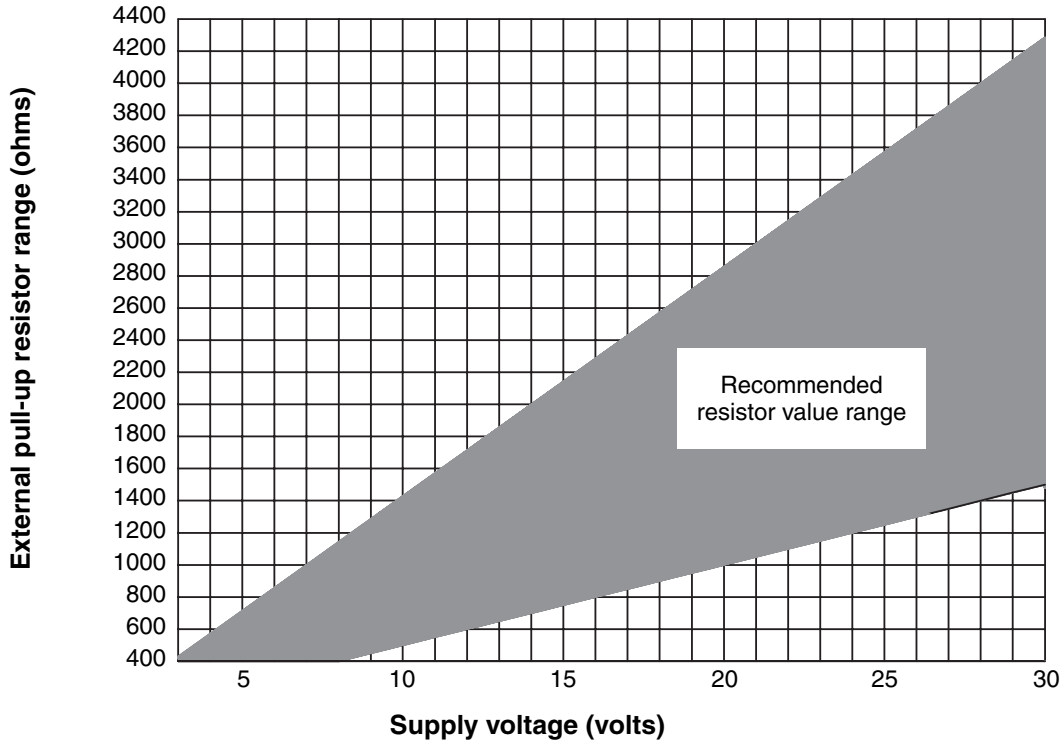


Figure 10-15 **Recommended pull-up resistor versus supply voltage – External power**



Note: When using a discrete output to drive a relay, choose external pull-up to limit current to less than 500 mA.

10.6 Discrete input wiring

Discrete input wiring depends on whether you have configured terminals 31 and 32 (Channel C) for internal or external power. The following diagrams are examples of proper wiring for these configurations:

- Internal power – Figure 10-16
- External power – Figure 10-17

If external power is configured, power may be supplied by a PLC or other device, or by direct DC input. See Table 10-2 for input voltage ranges.

Table 10-2 **Input voltage ranges for external power**

VDC	Range
3–30	High level
0–0.8	Low level
0.8–3	Undefined

Figure 10-16 Discrete input – Terminals 31 & 32 (Channel C) – Internal power

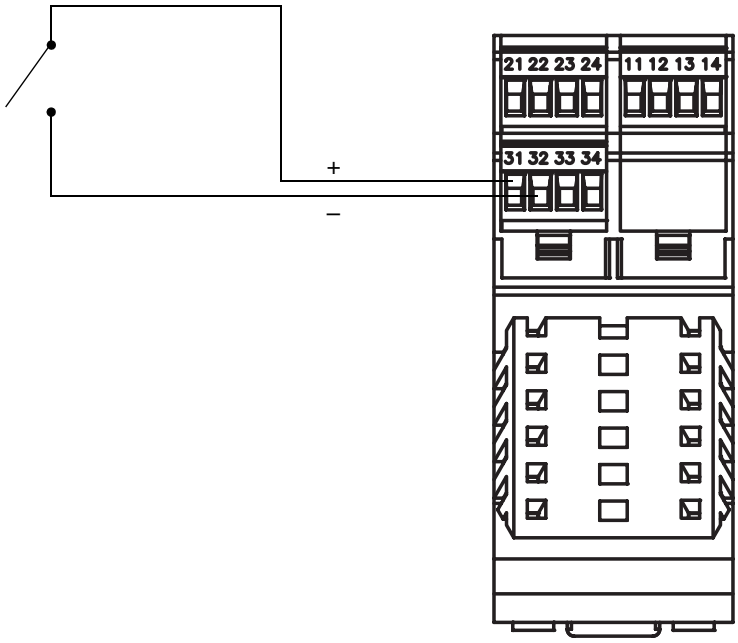
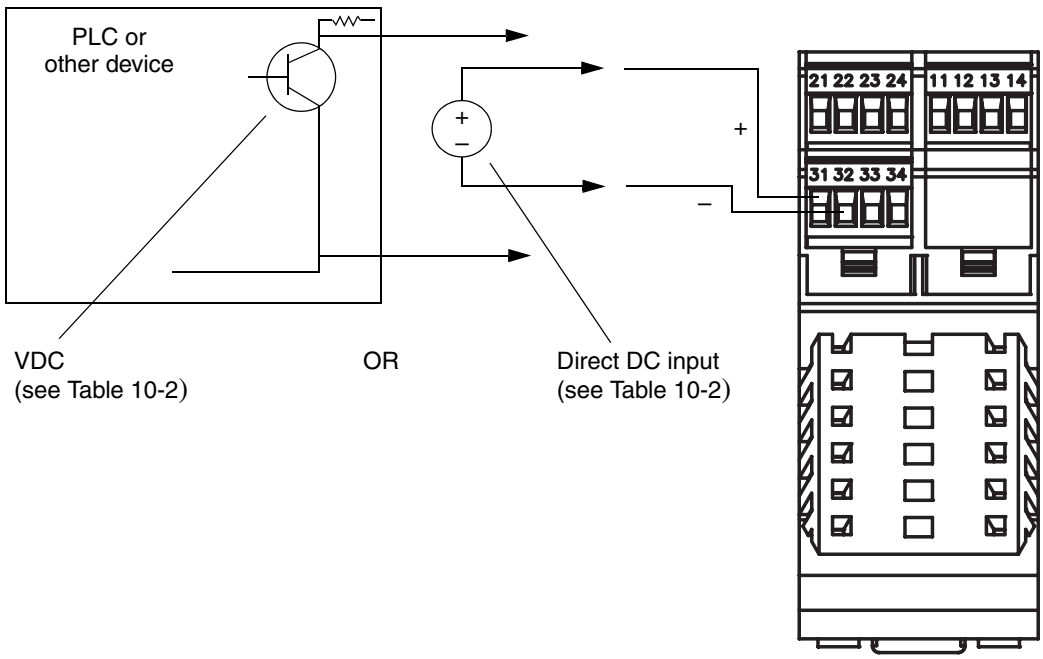


Figure 10-17 Discrete input – Terminals 31 & 32 (Channel C) – External power



10.7 Wiring to a remote host

Terminals 33 and 34 support Modbus/RS-485 communication with a remote host. For an example of wiring, see Figure 10-18. For terminal information, see Table 10-3.

Figure 10-18 Wiring to a remote host

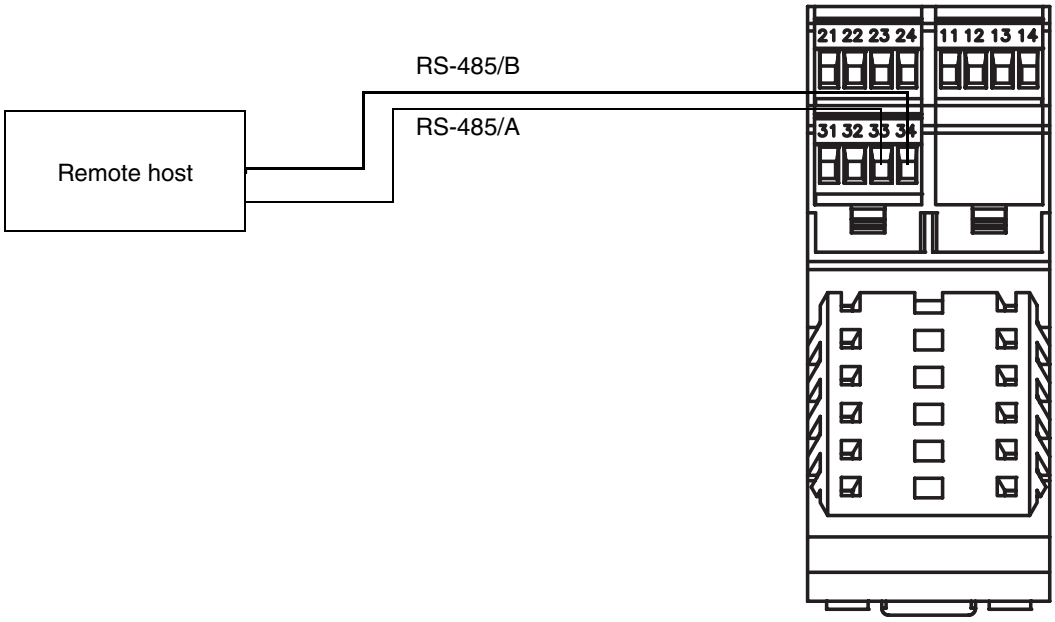


Table 10-3 Terminal assignments for Modbus/RS-485

RS-485 signal	Transmitter terminal
A	33
B	34

Appendix A
Dimensions and Specifications

A.1 Dimensions

Figure A-1 shows the dimensions of the LF-Series FM transmitter with a display.

Figure A-2 shows the dimensions of the LF-Series FM transmitter without a display.

Figure A-3 shows the dimensions of the LF-Series DIN transmitter.

Figure A-1 LF-Series FM transmitter with display

Dimensions in inches (mm)

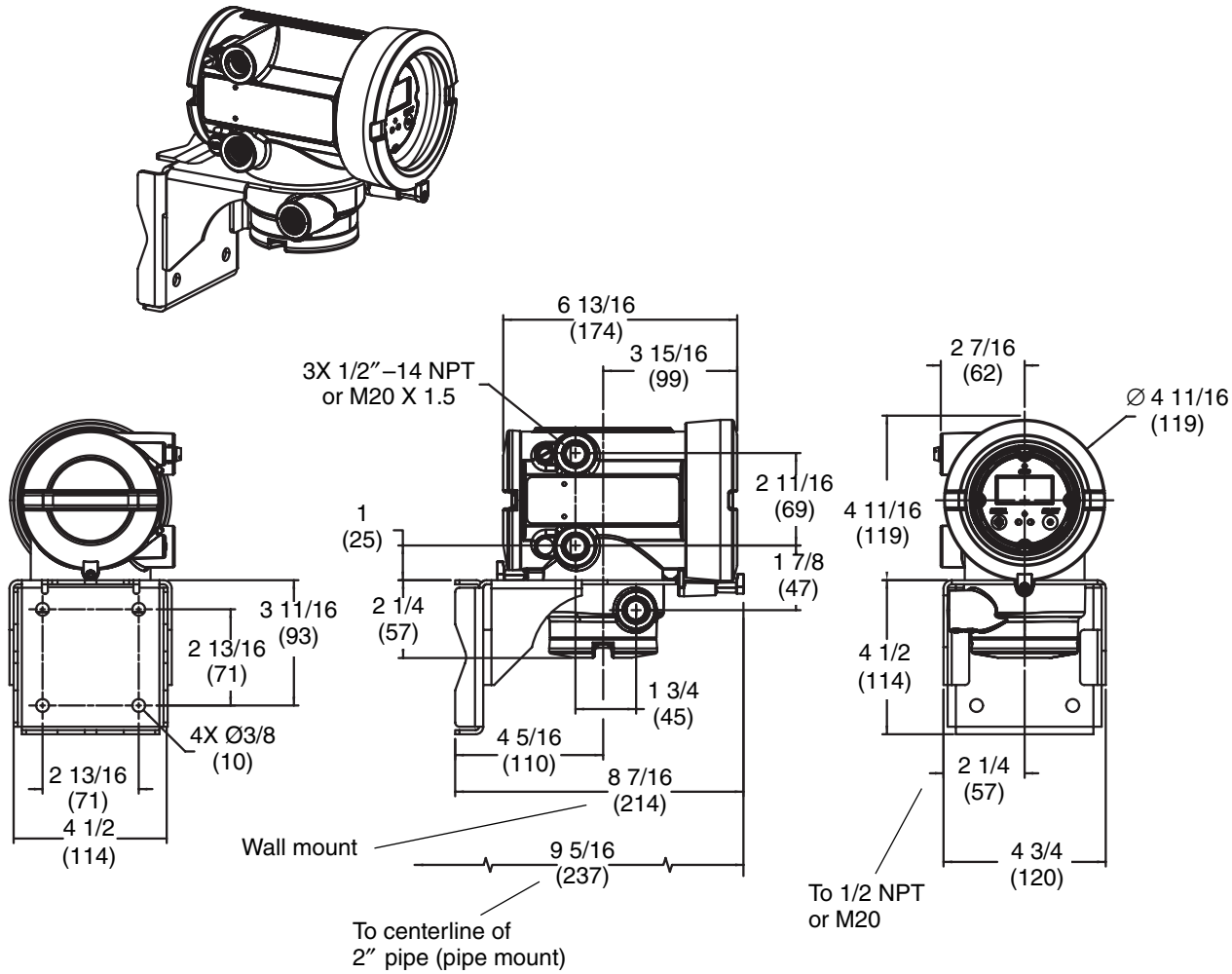


Figure A-2 LF-Series FM transmitter without display

Dimensions in inches (mm)

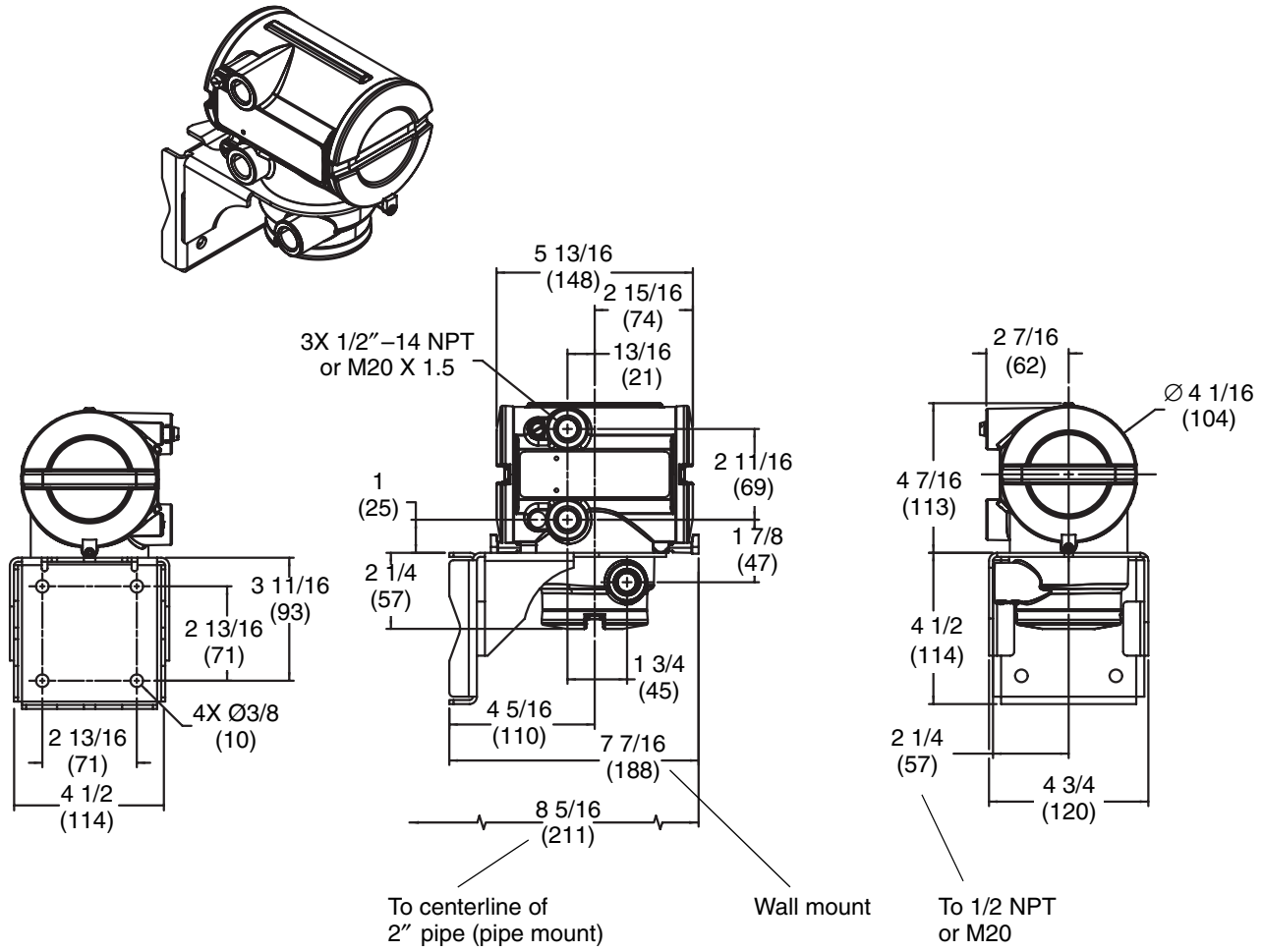
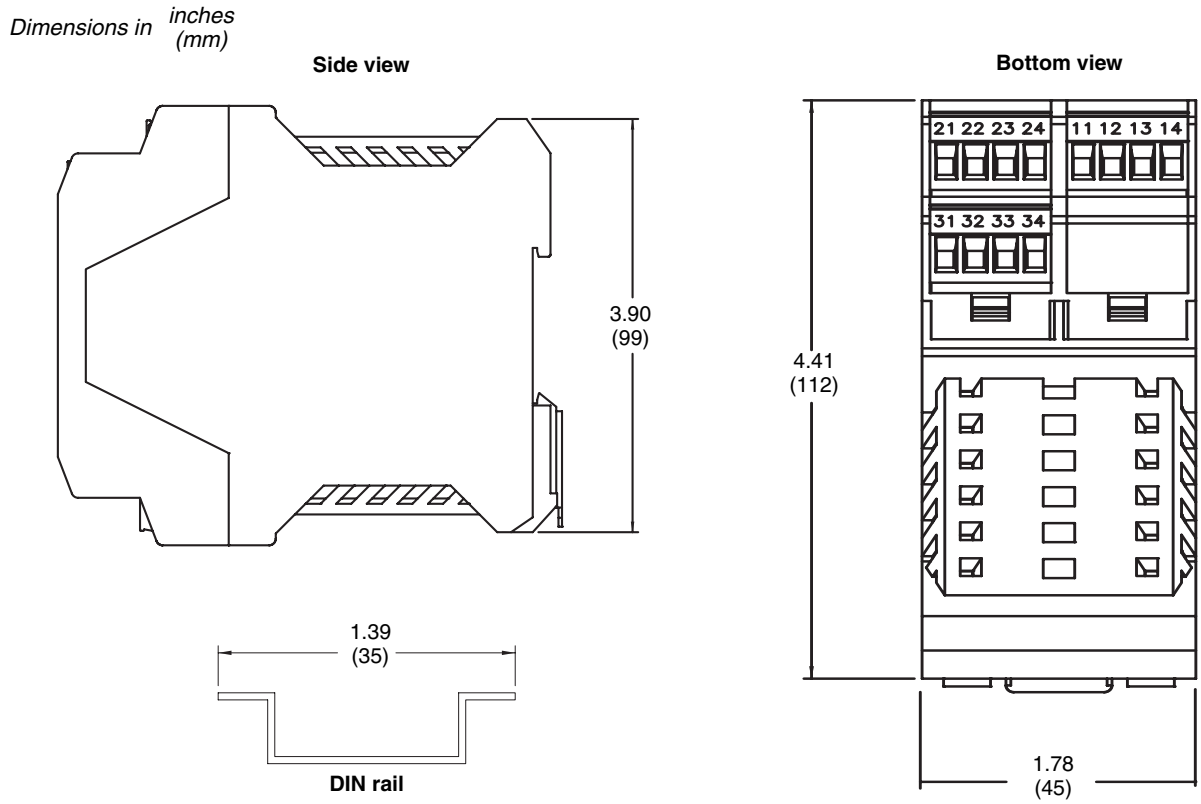


Figure A-3 LF-Series DIN transmitter



A.2 LF-Series sensor specifications

Table A-1 Liquid flow rates

		Mass		Volume[1]	
		lb/hr	kg/hr	gal/hr	l/hr
Nominal flow range[2]	LF2M	0.474	0,215	0.057	0,215
	LF3M	3.020	1,37	0.362	1,37
	LF4M	30.422	13,8	3.646	13,8
Maximum flow rate	LF2M	0.948	0,43	0.114	0,43
	LF3M	3.307	1,5	0.396	1,5
	LF4M	60.845	27,6	7.291	27,6

(1) Volume measurement is based on a process-fluid density of 1 g/cm^3 (1000 kg/m^3). For fluids with density other than 1 g/cm^3, the volumetric flow rate equals the maximum mass flow rate divided by the fluid's density.

(2) Micro Motion has adopted the terminology "nominal flow range." The upper limit of this range is the flow rate at which water at reference conditions causes approximately 15 psid (1 bar) of pressure drop.

Table A-2 Gas flow rates[1]

		Mass		Volume	
		lb/hr	kg/hr	SCFH	SCCM
Typical flow rate	LF2M	0.225	0,102	2.99	1408,0
	LF3M	0.881	0,400	11.7	5521,8
	LF4M	8.343	3,78	110.82	52300

(1) Flow rates that produce approximately 14.5 psid (1.0 bar) pressure drop on air at 70 °F (21.1 °C) and 500 psi (35 bar)

Table A-3 Liquid and gas performance

Mass flow accuracy[1]	Standard	±1.0% of rate or $\pm\left[\left(\frac{\text{zero stability}}{\text{flow rate}}\right)\times 100\right]$ % of rate, whichever is greater	
	Optional	±0.5% of rate or $\pm\left[\left(\frac{\text{zero stability}}{\text{flow rate}}\right)\times 100\right]$ % of rate, whichever is greater	
Mass flow repeatability		±0.05% of rate or $\pm\frac{1}{2}\left[\left(\frac{\text{zero stability}}{\text{flow rate}}\right)\times 100\right]$ % of rate, whichever is greater	
Mass flow reproducibility		±0.05% of rate or $\pm\frac{1}{2}\left[\left(\frac{\text{zero stability}}{\text{flow rate}}\right)\times 100\right]$ % of rate, whichever is greater	
Zero stability		lb/hr	kg/hr
	LF2M	0.0004	0,0002
	LF3M	0.0022	0,001
	LF4M	0.1264	0,012
Liquid density	Range[2]	0 to 0.3 g/cm^3 and 0.5 to 2.0 g/cm^3	
	Accuracy[3]	±0.005 g/cm^3	
	Repeatability	±0.002 g/cm^3	
Temperature	Ambient and process	0 to 65 °C (32 to 149 °F)	
	Accuracy	±0.5 °C (±1.0 °F)	
Maximum operating pressure	Standard	35 bar (500 psi)	
	Optional	100 bar (1500 psi)	

(1) Stated flow accuracy includes the combined effects of repeatability, linearity, and hysteresis. All specifications for liquids are based on reference conditions of water at 70 °F (21.1 °C).
(2) Contact factory for applications with fluid density between 0.3 and 0.5 g/cm^3.
(3) At temperatures other than 70 °F (21.1 °C), you can expect an additional density error of approximately 0.0005 g/cm^3 per °C.

Table A-4 Hazardous area classifications

Approvals agency	Classification
CSA[1]	Class I Division 2 Groups A, B, C, D Class II Division 2 Groups F and G Class III Division 2
ATEX[2]	CE ⟨Ex⟩ II 3 G EEx nA II T4 II 3 D IP65 T135°C

(1) CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. and in Canada.
(2) ATEX is a European directive.

Table A-5 Materials of construction

Component	Material
Wetted parts	316L stainless steel, 316L VAR and high alloy ferritic stainless steel 17-7PH
Process seals	Viton® fluoroelastomer[1], Buna, Kalrez, or EPDM
Housing	Epoxy-painted aluminum

(1) Viton® is a registered trademark of DuPont Performance Elastomers.

Table A-6 Physical specifications

Weight	3.5 lb (1,6 kg)
Fittings	See product data sheet

A.3 LF-Series transmitter specifications

A.3.1 Output options and output option codes

Table A-7 Transmitter outputs

Outputs	FM transmitters	DIN transmitters
1 mA output, 1 frequency/pulse output	Output option codes 1 and 3 (FM AN)	Output option code 2 (DIN AN)
2 mA outputs, 1 frequency/pulse output (configurable)	Output option code 4 (FM CIO)	Output option code 5 (DIN CIO)
FOUNDATION fieldbus	Output option code 6 (FM FB)	(Not available)
Profibus-PA	Output option code 7 (FM PB)	(Not available)

Table A-8 Output options for transmitters with configurable I/O

Channel	Terminals FM	Terminals DIN	Configuration option	Default process variable assignment	Power
A	1 & 2	21 & 22	mA output 1 (with Bell 202 HART)	Mass flow	Internal (active)
B	3 & 4	23 & 24	mA output 2 (default)	Density	Internal (active)
			Frequency output (FO)(1)	Mass flow	Internal (active) or external (passive)
			Discrete output 1 (DO1)	Fwd/Rev	
C	5 & 6	31 & 32	FO (default)(1)	Mass flow	Internal (active) or external (passive)
			Discrete output 2 (DO2)	Flow switch	
			Discrete input (DI)	None	

(1) When configured for two FOs (dual pulse), FO2 is generated from the same FO signal sent to the first FO. FO2 is electrically isolated but not independent.

A.3.2 LF-Series FM transmitters

Table A-9 FM transmitter physical specifications

Weight	With display: 8 lb (3, 6 kg) Without display: 7 lb (3,2 kg)
Mounting and cabling	Transmitters include a mounting bracket and 6.5 ft (2 m) of 4-wire twisted-pair shielded signal cable. Additional lengths up to 1000 ft (300 m) can be purchased. Hardware for installing the transmitter on the mounting bracket is included. The transmitter can be rotated on the mounting bracket, 360° in 90° increments.

Interface/Display (optional)	Segmented 2-line display with LCD screen with optical controls and flowmeter-status LED is standard.
	• LCD line 1 lists the process variable.
	• LCD line 2 lists engineering unit of measure.
	Non-glare tempered glass lens.
	Available in both backlit and non-backlit versions.
	Display is suitable for hazardous area installation. To facilitate various mounting orientations, the display can be rotated on the transmitter, 360° in 90° increments.
	Display controls feature optical switches that are operated through the glass with a red LED for visual feedback to confirm when a “button” is pressed.
	Display functions:
	• View process variables
	• Start, stop and reset totalizers
	• View and acknowledge alarms
	• Off-line (where applicable):
	  • Zero flowmeter
	  • Simulate outputs
	  • Change measurement units
	  • Configure ouputs
	  • Set RS-485 communications options

Status light	Three-color LED status light on display panel indicates flowmeter condition at a glance.

Table A-10 FM transmitter electrical connections

Input and output connections	One (output option codes 6 and 7), two (output option codes 1 and 3), or three (output option code 4) pairs of wiring terminals for transmitter outputs Screw terminals accept one or two solid conductors, 14 to 12 AWG (2,0 to 3,5 mm^2); or one or two stranded conductors, 22 to 14 AWG (0,34 to 2,5 mm^2)
Power connections	One pair of wiring terminals accepts AC or DC power One internal ground lug for power-supply ground wiring Screw terminals accept one or two solid conductors, 14 to 12 AWG (2,0 to 3,5 mm^2); or one or two stranded conductors, 22 to 14 AWG (0,34 to 2,5 mm^2)
Service port connection	Two clips for temporary connection to the service port
Sensor connection	Two pairs of terminals for the 4-wire connection to the sensor • One pair is used for the RS-485 connection to the sensor • One pair is used to supply power to the sensor Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0,2 to 2,5 mm^2)

Table A-11 FM transmitter input/output signals

All transmitters	One 4-wire sensor signal input connection with ground
Output option code 1 or 3 (1 mA, 1 FO)	One active 4–20mA output • Not intrinsically safe • Isolated to ±50 VDC from all other outputs and earth ground • Maximum load limit: 600 ohms • Flow-only transmitter can report mass flow or volume flow • Multivariable transmitter can report mass flow, volume flow, density, temperature, or drive gain • Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)
	One active or passive frequency/pulse output • Not intrinsically safe • Can report mass flow or volume flow, which can be used to indicate flow rate or total • Flow-only transmitter: frequency output reports the same flow variable as the mA output • Multivariable transmitter: frequency output is independent of the mA output • Scalable to 10,000 Hz • Maximum output of +24 VDC ±3% with a 2.2 kohm internal pull-up resistor Output is linear with flow rate to 12,500 Hz

Table A-11 FM transmitter input/output signals *continued*

Output option code 4 (2 mA, 1 FO configurable, multivariable transmitter only)	One or two active 4–20 mA outputs • Not intrinsically safe • Isolated to ±50 VDC from all other outputs and earth ground • Maximum load limit: - mA1: 820 ohms - mA2: 420 ohms • Can report mass flow, volume flow, density, temperature, or drive gain • Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)
	One active or passive frequency/pulse output • Not intrinsically safe • Can report mass flow or volume flow, which can be used to indicate flow rate or total • Scalable to 10,000 Hz • Power: - Internal (active): +15 VDC ±3% with a 2.2 kohm internal pull-up resistor - External (passive): +30 VDC maximum, +24 VDC typical • Output is linear with flow rate to 12,500 Hz
	One or two active or passive discrete outputs • Not intrinsically safe • Can report event 1, event 2, event 1 and event 2, flow switch, forward/reverse flow, calibration in progress, or fault • Power: - Internal (active): +15 VDC ±3% with a 2.2 kohm internal pull-up resistor - External (passive): +30 VDC maximum, +24 VDC typical • Maximum sink capability: 500 mA
	One discrete input • Can be configured for internal or external power • Not intrinsically safe • Power: - Internal (active): +15 VDC, 7 mA maximum source current - External (passive): +3 to 30 VDC maximum • Can report reset all totals, reset mass total, reset volume total, or start sensor zero
Output option code 6 (FOUNDATION fieldbus)	One FOUNDATION fieldbus H1 output Manchester-encoded digital signal conforms to IEC 1158-2
Output option code 7 (Profibus-PA)	One Profibus-PA output Manchester-encoded digital signal conforms to IEC 1158-2

Table A-12 FM transmitter digital communications

All transmitters	One service port can be used for temporary connection only Uses RS-485 Modbus signal, 38.4 kilobaud, one stop bit, no parity
Output option code 1, 3, or 4	HART Bell 202 signal is superimposed on the primary milliamp output, and is available for host system interface: • Frequency: 1.2 and 2.2 kHz • Amplitude: to 0.8 V peak-to-peak • 1200 baud • Requires 250 to 600 ohms resistance
Output option code 1 or 3	One RS-485 output can be used for direct connection to a HART or Modbus host system. Modbus communications supports 7-bit or 8-bit protocol (default: 8-bit), 1200 to 38,400 baud (default: 9600), one or two stop bits (default: one), and odd, even, or no parity (default: odd). Configuration can be changed using ProLink II software or the display (if applicable).

Table A-12 FM transmitter digital communications *continued*

Output option code 6 (FOUNDATION fieldbus)	Transmitters are registered with the Fieldbus Foundation, and conform to the FOUNDATION fieldbus H1 protocol specification. Input frequency from sensor: • Mass flow: 20 Hz • Volume flow: 20 Hz • Density: 20 Hz • Temperature: 1Hz Analog input function blocks: • Cycle time: Host dependent • Update rate: 50 milliseconds • Refresh rate: Host dependent
Output option code 7 (Profibus-PA)	Transmitters are registered with the Profibus Organization, and fulfill the requirements of the Profibus-PA Profile for Process Control Devices. Input frequency from sensor: • Mass flow: 20 Hz • Volume flow: 20 Hz • Density: 20 Hz • Temperature: 1Hz Analog input function blocks: • Cycle time: Host dependent • Update rate: 50 milliseconds • Refresh rate: Host dependent Siemens Simatic PDM required for configuration.

Table A-13 FM transmitter power supply

Self-switching AC/DC input, automatically recognizes supply voltage. Complies with low voltage directive 73/23/EEC per IEC 61010-1 Installation (Overvoltage) Category II, Pollution Degree 2. The transmitter fieldbus circuit is passive, and draws its power from the fieldbus segment. Current draw from the fieldbus segment is 11.5 mA.	
AC power	85 to 265 VAC, 50/60 Hz, 6 watts typical, 11 watts maximum
DC power	18 to 100 VDC, 6 watts typical, 11 watts maximum At startup, transmitter power source must provide a minimum of 1.5 amperes of short-term current at a minimum of 18 volts at the transmitter's power input terminals. Minimum 22 VDC with 1000 feet of 18 AWG (300 meters of 0,8 mm^2) power supply cable
Fuse	IEC 127-1.25 fuse, slowblow

Table A-14 FM transmitter environmental limits

Ambient temperature limits	Operating and storage: –40 to +140 °F (–40 to +60 °C) Display responsiveness decreases and display may become difficult to read below –4 °F (–20 °C). Above 131 °F (55 °C), some darkening of the display might occur. ATEX requires limiting ambient temperature to below 131 °F (55 °C).
Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)
Vibration limits	Meets IEC68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g.

Table A-15 FM transmitter environmental effects

EMI effects	Meets EMC directive 89/336/EEC per EN 61326 Industrial
Ambient temperature effect	On analog outputs ±0.005% of span per °C

Table A-16 FM transmitter hazardous area classifications

Approvals agency	Classification
CSA[1]	Class I Division 2 Groups A, B, C, D Class II Division 2 Groups F and G Class III Division 2
ATEX[2]	With display: CE ⟨Ex⟩ II 3 G EEx nC [L] IIB+H2 T6 II 3 D IP66/IP67 T65°C
	Without display or with optional display cover: CE ⟨Ex⟩ II 3 G EEx nC [L] IIC T6 II 3 D IP66/IP67 T65°C

(1) CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. and in Canada.
(2) ATEX is a European directive.

A.3.3 LF-Series DIN transmitters

Table A-17 DIN transmitter physical specifications

Housing	Polyamide PA 6.6
Weight	0.52 lbs (0,24 kg)
Mounting and cabling	DIN rail transmitters are mounted on a 35 mm rail. The rail must be grounded. Transmitters include a mounting bracket and 6.5 ft (2 m) of 4-wire twisted-pair shielded signal cable. Additional lengths up to 1000 ft (300 m) can be purchased.
Status LED	Three-color LED status light on face of transmitter indicates flowmeter condition at a glance, using a solid green, yellow or red light. Zero in progress is indicated by a flashing yellow light.
Zero button	A zero button on the face of the transmitter can be used to start the transmitter zero process.

Table A-18 DIN transmitter electrical connections

Input and output connections	Three pairs of wiring terminals for transmitter outputs One pair of terminals for digital communications (Modbus/RS-485) Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0,2 to 3,5 mm^2)
Power connections	Two pairs of terminals • Either pair accepts DC power • The remaining pair is used for making a jumper connection to a second transmitter Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0,2 to 3,5 mm^2)
Sensor connection	The transmitter has two pairs for the 4-wire connection to the sensor • One pair is used for the RS-485 connection to the sensor • One pair is used to supply power to the sensor Plug connectors accept stranded or solid conductors, 24 to 12 AWG (0,2 to 3,5 mm^2)

Table A-19 DIN transmitter input/output signals

All transmitters	One 4-wire sensor signal input connection with ground
Output option code 2 (1 mA, 1 FO)	One active 4–20mA output • Not intrinsically safe • Isolated to ±50 VDC from all other outputs and earth ground • Maximum load limit: 600 ohms • Can report mass flow or volume flow • Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)
	One active or passive frequency/pulse output • Not intrinsically safe • Can report mass flow or volume flow, which can be used to indicate flow rate or total • Frequency output reports the same flow variable as the mA output • Scalable to 10,000 Hz • Maximum output of +24 VDC ±3% with 2.2 kohm internal pull-up resistor • Output is linear with flow rate to 12,500 Hz
Output option code 5 (2 mA, 1 FO configurable, multivariable transmitter only)	One or two active 4–20 mA outputs • Not intrinsically safe • Isolated to ±50 VDC from all other outputs and earth ground • Maximum load limit: - mA1: 820 ohms - mA2: 420 ohms • Can report mass flow, volume flow, density, temperature, or drive gain Output is linear with process from 3.8 to 20.5 mA, per NAMUR NE43 (June 1994)
	One active or passive frequency/pulse output • Not intrinsically safe • Can report mass flow or volume flow, which can be used to indicate flow rate or total • Scalable to 10,000 Hz • Power: - Internal (active): +15 VDC ±3% with 2.2 kohm internal pull-up resistor - External (passive): +30 VDC maximum, 24 VDC typical, sinking up to 500 mA at 30 VDC Output is linear with flow rate to 12,500 Hz
	One or two active or passive discrete outputs • Not intrinsically safe • Can report event 1, event 2, event 1 and event 2, flow switch, forward/reverse flow, calibration in progress, or fault • Power: - Internal (active): +15 VDC ±3% with 2.2 kohm internal pull-up resistor - External (passive): +30 VDC maximum, +24 VDC typical, sinking up to 500 mA at 30 VDC Maximum sink capability: 500 mA
	One discrete input • Can be configured for internal or external power • Not intrinsically safe • Power: - Internal: +15 VDC, 7 mA maximum source current - External: +3 to 30 VDC maximum Can reset all totals, reset mass total, reset volume total, or start sensor zero

Table A-20 DIN transmitter digital communications

All transmitters	One pair of terminals supports Modbus/RS-485 signal or SP (service port) mode. HART/Bell 202 signal is superimposed on the primary mA output, and is available for host system interface • Frequency: 1.2 and 2.2 kHz • Amplitude: 0.8 V peak-to-peak • 1200 baud • Requires 250 to 600 ohms load resistance

Table A-21 DIN transmitter power supply

Requires DC power Meets Installation (Overvoltage) Category II, Pollution Degree 2 requirements Contains an IEC 1.6A slowblow fuse	
Power requirements	19.2 to 28.8 VDC, 6.3 watts maximum At startup, transmitter power source must provide a minimum of 1.0 amperes of short-term current per transmitter Length and conductor diameter of the power cable must be sized to provide 19.2 VDC minimum at the power terminals, at a load current of 330 mA

Table A-22 DIN transmitter environmental limits

Ambient temperature limits	Operating: –40 to +131 °F (–40 to +55 °C) Storage: –40 to +185 °F (–40 to +85 °C) If temperature is above 113 °F (45 °C) and you are mounting multiple transmitters, they must be mounted at least 8.5 mm apart.
Humidity limits	5 to 95% relative humidity, non-condensing at 140 °F (60 °C)
Vibration limits	Meets IEC68.2.6, endurance sweep, 5 to 2000 Hz, 50 sweep cycles at 1.0 g

Table A-23 DIN transmitter environmental effects

EMI effects	Meets EMC directive 89/336/EEC per EN 61326 Industrial
Ambient temperature effect	On analog outputs ±0.005% of span per °C

Table A-24 DIN transmitter hazardous area classifications

Approvals agency	Classification
CSA[(1)]	Class I Division 2 Groups A, B, C, D Class II Division 2 Groups F and G Class III Division 2
ATEX[(2)]	Transmitter has no ATEX classification, and should be installed only in safe areas. Transmitter outputs are acceptable for connecting to a sensor (II 3G EEx nA) in a hazardous area.

(1) CSA is a Canadian approvals agency that provides approvals accepted both in the U.S.A. and in Canada.
(2) ATEX is a European directive.

Appendix B
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.

B.1 New and unused equipment

Only equipment that has not been removed from the original shipping package will be considered new and unused. New and unused equipment requires a completed Return Materials Authorization form.

B.2 Used equipment

All equipment that is not classified as new and unused is considered used. This equipment must be completely decontaminated and cleaned before being returned.

Used equipment must be accompanied by a completed Return Materials Authorization form and a Decontamination Statement for all process fluids that have been in contact with the equipment. If a Decontamination Statement cannot be completed (e.g., for food-grade process fluids), you must include a statement certifying decontamination and documenting all foreign substances that have come in contact with the equipment.

Appendix C
CE Certification

C.1 Overview

This appendix contains information related to compliance with Electro Magnetic Compatibility (EMC) directive 89/336/EEC, Low Voltage Directive 73/23/EEC, and ATEX directive 94/9/EC.

C.2 CE compliance information

Micro Motion equipment bearing the CE mark has been successfully tested to the regulations of Electro Magnetic Compatibility (EMC) directive 89/336/EEC, Low Voltage Directive 73/23/EEC, and ATEX directive 94/9/EC. This section contains a brief overview of the installation requirements. For complete information, refer to the installation instructions earlier in this manual, and to the ATEX D-IS instructions, available on the Micro Motion web site.

Table C-1 Compliance requirements

Directive	Applies to	Requirement
Electro Magnetic Compatibility (EMC) Directive 89/336/EEC	All LF-Series flowmeters	• The sensor mounting plate must be grounded to earth. • The transmitter must be grounded to earth. • For the cable used between the sensor and the transmitter: - Micro Motion supplies high-quality cable that meets the specifications for CE certification. - If you provide your own signal cable, you should use a cable which is overall completely shielded with a 100% shield. - If "Circular" type connectors are used, they should be shielded with a metal shield. If applicable, metal cable glands providing cable shield clamping must be used. - The cable shield should be terminated to earth ground.
Low Voltage Directive 73/23/EEC	All LF-Series transmitters that use AC power	• A user-supplied switch must be installed in the power supply line in close proximity to the transmitter.
ATEX Directive 94/9/EC	Transmitter models LFT(1/3/4/6/7)**L****	• When cable entries are used, they shall conform to clause 7.2.6 of EN 50021. • In an ambient temperature of less than –20 °C, suitable cable and cable entries or conduit entries for this condition shall be used. • A type of protection of at least IP 54 according to EN 60529 will be achieved only when cable and conduit entries providing IP 54 according to EN 60529 are used.
	Transmitter models LFT(6/7)**L****	• The cover of the terminal compartment containing terminals 1–6 may be removed for short periods when the apparatus is in service to permit checking or adjustment of energized energy-limited circuits.
	Transmitter models LFT(2/5)**L****	• When multiple transmitters are stacked on a single DIN rail and the ambient temperature is above 45 °C, the units must be spaced at least 10 mm apart.
	Sensor models LF(2/3/4)*******L***** (all sensors)	• When the temperature under rated conditions is higher than 70 °C at the cable or conduit entry point, or 80 °C at the branching point of the conductors, the temperature rating of the cable used between the sensor and the transmitter shall be higher than the actually measured temperature values. • Provisions shall be made to prevent the rated voltage being exceeded by transient disturbances of more than 40%.

Oplysninger om CE-overensstemmelse – Danish

Udstyr fra Micro Motion med CE-mærket er gennemprøvet i overensstemmelse med reglerne for elektromagnetisk kompatibilitet (EMC)-direktivet 89/336/EØF, Lavspændingsdirektivet 73/23/EØF og ATEX-direktivet 94/9/EF. Dette afsnit indeholder en kort oversigt over installationskravene. For mere fyldestgørende oplysninger henvises til installationsvejledningen tidligere i denne manual og til ATEX D-IS-vejledningen, som kan ses på Micro Motions hjemmeside.

Tabel C-1 Krav til overensstemmelse

Direktiv	Gælder for	Krav
Elektromagnetisk kompatibilitet (EMC)-direktivet 89/336/EØF	Alle flowmålere i LF-serien	• Sensorens monteringsplade skal have jordforbindelse. • Transmitteren skal have jordforbindelse. • Vedørende kablet, der anvendes mellem sensoren og transmitteren: - Micro Motion leverer et kabel af høj kvalitet, som er i overensstemmelse med specifikationerne for CE-certificering. - Hvis man bruger sit eget signalkabel, skal der bruges et kabel, som er helt afskærmet med en 100% skærm. - Hvis der bruges stik af "cirkulationstypen", skal de være afskærmede med en metalskærm. Hvis relevant, skal der bruges kabelforskruninger med påsat kabelskærm. - Kabelskærmen skal være afsluttes i en jordforbindelse.
Lavspændings-direktiv 73/23/EØF	Alle transmittere i LF-serien, som bruger vekselstrøm	• Der skal installeres en brugerleveret kontakt til netstrømsledningen i nærheden af transmitteren.
ATEX-direktivet 94/9/EF	Transmittermodeller LFT(1/3/4/6/7)**L****	• Hvis der bruges kabelindgange, skal de være i overensstemmelse med paragraf 7.2.6 i EN 50021. • Når den omgivende temperatur er under –20°C, skal der anvendes kabler og kabelindgange eller ledningsrørindgange, der passer til denne tilstand. • Beskyttelse af typen IP 54 i henhold til EN 60529 kan som minimum kun opnås, hvis der bruges kabler og ledningsrørindgange, som giver beskyttelse af typen IP 54 i henhold til EN 60529.
	Transmittermodeller LFT(6/7)**L****	• Dækslet på klemmerummet med klemmerne 1–6 kan fjernes i en kortere periode, når apparatet skal serviceres, så tilsluttede energibegrænsede kredsløb kan kontrolleres eller justeres.
	Transmittermodeller LFT(2/5)**L****	• Når flere transmittere er stablet på en enkelt DIN-skinne og den omgivende temperatur er over 45°C, skal enhederne være placeret med en afstand på mindst 10 mm fra hinanden.
	Sensormodeller LF(2/3/4)*******L***** (alle sensorer)	• Når temperaturen under klassificerede forhold er højere end 70°C ved kablet eller rørindgangspunktet, eller 80°C ved ledernes forgreningspunkt skal temperaturklassificeringen for det kabel, der anvendes mellem sensoren og transmitteren, være højere end de faktisk målte temperaturværdier. • Der skal tages forholdsregler for at forhindre, at mærkespændingen overskrides af transientudsving på mere end 40%.

Informatie CE-compliantie – Dutch

De Micro Motion apparatuur die is voorzien van het CE merk is met succes getest wat betreft de voorschriften van de EMC (Electro Magnetic Compatibility)-richtlijn 89/336/EEG, Laagspanningrichtlijn 73/23/EEG, en ATEX richtlijn 94/9/EG. Deze sectie bevat een kort overzicht van de installatievereisten. Raadpleeg voor complete informatie de installatie-instructies eerder in deze handleiding, en de ATEX D-IS instructies, beschikbaar op de website van Micro Motion.

Tabel C-1 Compliantievereisten

Richtlijn	geldig voor	vereisten
Elektromagnetische compatibiliteit (EMC) 89/336/EEG	Alle flowmeters uit de LF-serie	• De sensormontageplaat moet op de massa worden geaard. • De transmitter moet op de massa worden geaard. • Voor de kabel tussen de sensor en de transmitter: - Micro Motion levert een hoge kwaliteit kabel die voldoet aan de specificaties voor CE-certificatie. - Als u uw eigen signaalkabel gebruikt, dient u een kabel te gebruiken die overal geheel is afgeschermd met een 100% afscherming. - Als u stekkers van het ronde type gebruikt, moeten zij zijn afgeschermd met een metalen afscherming. Indien van toepassing moeten metalen kabeldoorvoeren worden gebruikt die de kabel afschermend vastklemmen. - De kabelafscherming moet zijn aangesloten op de massaverbinding.
Laagspanningrichtlijn 73/23/EEG	Alle transmitters uit de LF-serie die wisselstroom gebruiken	• Een door de gebruiker aangeschafte schakelaar moet vlakbij de transmitter in de stroomvoorzieningsleiding worden geïnstalleerd.
ATEX-richtlijn 94/9/EG	Transmitter modellen LFT(1/3/4/6/7)**L****	• Als er kabelingangen worden gebruikt, moeten zij voldoen aan clausule 7.2.6 van EN 50021. • Als de omgevingstemperatuur lager is dan –20°C, moeten kabels en kabelingangen of leidingingangen worden gebruikt die geschikt zijn voor die omstandigheden. • Er wordt uitsluitend een type bescherming van tenminste IP 54 overeenkomstig EN 60529 bereikt als er kabels en leidingingangen worden gebruikt die IP 54 leveren, overeenkomstig EN 60529.
	Transmitter modellen LFT(6/7)**L****	• De kap van het aansluitingscompartiment met aansluitingen 1–6 kan gedurende korte periodes worden verwijderd terwijl het apparaat in bedrijf is zodat onder spanning staande energie-begrensde circuits kunnen worden gecontroleerd of afgesteld.
	Transmitter modellen LFT(2/5)**L****	• Als meerdere transmitters op een enkele DIN-rail zijn gestapeld en de omgevingstemperatuur is hoger dan 45°C, moeten de units tenminste 10 mm van elkaar staan.
	Sensor modellen LF(2/3/4)*******L***** (alle sensoren)	• Als de temperatuur onder de gespecificeerde omstandigheden bij de kabel of het ingangsleidingpunt hoger is dan 70°C, of 80°C bij het aftakpunt van de geleiders, zal de temperatuurspecificatie van de kabel tussen de sensor en de transmitter hoger zijn dan de werkelijk gemeten temperatuurwaarden. • Er dienen maatregelen te worden getroffen om te voorkomen dat de gespecificeerde spanning wordt overschreden door transiënt-storingen van meer dan 40%.

CE-vaatimustenmukaisuustiedot – Finnish

CE-merkillä varustetut Micro Motion -laitteet ovat läpäisseet sähkömagneettista yhteensopivuutta koskevan direktiivin 89/336/ETY, matalajännitedirektiivin 73/23/ETY ja ATEX-direktiivin 94/9/EY vaatimusten mukaiset testit. Tässä osassa on annettu lyhyt yhteenveto asennusvaatimuksista. Täydelliset tiedot vaatimuksista ovat nähtävissä tässä käsikirjassa aiemmin annetuista asennusohjeista sekä Micro Motionin verkkosivuilla olevista ATEX D-IS -ohjeista.

Taulukko C-1 Vaatimustenmukaisuus

Direktiivi	Koskee seuraavia	Vaatimus
Sähkömagneettista yhteensopivuutta koskeva direktiivi 89/336/ETY	Kaikki LF-sarjan virtausmittarit	• Anturin asennuslevy on maadoitettava. • Lähetin on maadoitettava. • Anturin ja lähettimen välinen kaapeli: - Micro Motion toimittaa hyvälaatuisen kaapelin, joka täyttää CE-todistuksen vaatimukset. - Jos käytät omaa signaalikaapelia, sen on oltava 100-prosenttisesti suojattu kaikkialta. - Jos käytät pyöreitä liittimiä, niissä on oltava metallisuojus. Tarvittaessa on käytettävä kaapelinsuojuskiristimellä varustettuja metallisia kaapelin läpivientiholkkeja. - Kaapelinsuojuksen pää on maadoitettava.
Matalajännitedirektiivi 73/23/ETY	Kaikki vaihtovirtaa käyttävät LF-sarjan lähettimet	• Käyttäjän on asennettava kytkin jännitteensyöttölinjaan lähelle lähetintä.
ATEX-direktiivi 94/9/EY	Lähetinmallit LFT(1/3/4/6/7)**L****	• Jos käytetään kaapeliläpivientejä, niiden on täytettävä standardin EN 50021 lausekkeen 7.2.6 vaatimukset. • Ympäröivän lämpötilan ollessa kylmempää kuin –20 °C, on käytettävä tällaisiin oloihin sopivia kaapeleita tai kaapeli- tai johdinläpivientejä. • Suojausluokka IP 54 standardin EN 60529 mukaisesti saadaan vain käytettäessä kaapeli- ja johdinläpivientejä, joiden luokitus on IP 54 standardin EN 60529 mukaisesti.
	Lähetinmallit LFT(6/7)**L****	• Liittimet 1–6 sisältävän liitinkotelon kansi voidaan poistaa lyhyiksi ajoiksi koneen huoltoa varten, jotta virroitettuja energiarajoitteisia piirejä voidaan tarkistaa tai muuttaa.
	Lähetinmallit LFT(2/5)**L****	• Kun useita lähettimiä pinotaan yhteen DIN-kiskoon ympäristön lämpötilan ollessa yli 45 °C, laitteiden väliin on jätettävä vähintään 10 mm.
	Lähetinmallit LFT(2/3/4)*******L***** (kaikki anturit)	• Jos lämpötila on nimellisolosuhteissa yli 70 °C kaapeli- tai johdinläpivientikohdassa tai 80 °C johtimien haarautumiskohdassa, anturin ja lähettimen välisen kaapelin arvon on oltava suurempi kuin todellisuudessa mitatut lämpötila-arvot. • On ryhdyttävä varotoimenpiteisiin, jotta ohimenevät häiriöt eivät ylitä nimellisjännitettä enempää kuin 40 %.

Informations relatives à la conformité CE – French

Les instruments Micro Motion portant la marque CE ont été testés afin de garantir leur conformité aux directives 89/336/EEC (compatibilité électromagnétique), 73/23/EEC (basses tensions) et 94/9/EC (ATEX). Cette section comporte une brève description des règles d'installation. Pour plus d'informations, se reporter aux instructions d'installation incluses dans ce manuel ainsi qu'aux instructions d'installation ATEX disponibles sur le site Internet de Micro Motion.

Tableau C-1 Exigences de conformité aux directives européennes

Directive	Appareil concerné	Exigences
Directive 89/336/EEC (compatibilité électromagnétique)	Tous les débitmètres Série LF	• Le support de montage du capteur doit être relié à la terre. • Le transmetteur doit être relié à la terre. • Pour le câble de liaison entre le capteur et le transmetteur : - Micro Motion livre un câble de haute qualité qui répond aux normes de certification CE. - Si le câble utilisé n'est pas fourni par Micro Motion, il doit être entièrement blindé. - Si des connecteurs de type « circulaire » sont utilisés, ils doivent être blindés à l'aide d'un blindage métallique. Si nécessaire, utiliser des presse-étoupe métalliques pour assurer la terminaison du blindage du câble. - Le blindage du câble doit être relié à la terre.
Directive 73/23/EEC (basses tensions)	Tous transmetteurs Série LF avec alimentation c.a.	• Un interrupteur fourni par l'utilisateur doit être installé sur la ligne d'alimentation électrique à proximité immédiate du transmetteur.
Directive 94/9/EC (ATEX)	Transmetteurs modèles LFT(1/3/4/6/7)**L****	• Les entrées de câble utilisées doivent être conformes à la clause 7.2.6 de la norme EN 50021. • Si la température ambiante est inférieure à –20 °C, il faut utiliser des câbles et des entrées de câble qui sont certifiés pour cette température. • Une protection de type IP 54 minimum selon la norme EN 60529 n'est garantie que si le câble et les entrées de câble utilisés assurent un degré de protection IP 54 selon la norme EN 60529.
	Transmetteurs modèles LFT(6/7)**L****	• Le couvercle du compartiment de câblage renfermant les bornes 1 à 6 peut être ôté brièvement lorsque l'appareil est en service pour permettre la vérification et l'ajustement de circuits à énergie limitée qui sont sous tension.
	Transmetteurs modèles LFT(2/5)**L****	• Si plusieurs transmetteurs sont placés sur un même rail DIN et que la température ambiante est supérieure à 45 °C, ils doivent être espacés de 10 mm au minimum.
	Capteurs modèles LF(2/3/4)******L***** (tous capteurs)	• Si aux conditions nominales la température est supérieure à 70 °C au niveau de l'entrée du câble ou du conduit, ou à 80 °C au niveau du point d'embranchement des conducteurs, la tenue en température du câble utilisé entre le capteur et le transmetteur devra être supérieure à la température mesurée. • Les dispositions nécessaires devront être prises afin de s'assurer que les surtensions transitoires ne soient pas supérieures de 40 % de la tension nominale.

Informationen zur CE Konformität – German

Micro Motion Produkte erhalten das CE Zeichen nach erfolgreichen Tests gemäss der Richtlinie für die Elektromagnetische Verträglichkeit (EMV) 89/336/EEC, der Niederspannungsrichtlinie 73/23/EEC und der ATEX Richtlinie 94/9/EC. Dieser Abschnitt enthält eine Übersicht über die Installations-Anforderungen. Die kompletten Informationen finden Sie weiter vorne in dieser Betriebsanleitung in den Installationsanweisungen und in den ATEX D-Eigensicheren Anweisungen, verfügbar auf der Micro Motion Website.

Tabelle C-1 Konformitäts-Anforderungen

Richtlinie	Zutreffend auf	Anforderung
Elektromagnetische Verträglichkeit (EMV) Richtlinie 89/336/EEC	Alle LF-Serie Durchfluss-Messsysteme	• Die Sensor Montageplatte muss geerdet werden. • Die Auswerteelektronik muss geerdet werden. • Zu verwendendes Kabel zwischen Sensor und Auswerteelektronik: - Micro Motion liefert hoch qualitatives Kabel, das die Spezifikationen der CE Zertifizierung erfüllt. - Wenn Sie Ihr eigenes Signalkabel verwenden, sollten Sie ein Kabel verwenden, das komplett mit einem 100 %-igen Schirm abgeschirmt ist. - Wenn Sie „Rundanschlussklemmen“ („Circular“) verwenden, sollten diese mit einem Metallschirm abgeschirmt sein. Falls geeignet, müssen Kabelverschraubungen aus Metall mit Kabelschirm Befestigung verwendet werden. - Der Kabelschirm sollte an Erde aufgelegt werden.
Niederspannungs-richtlinie 73/23/EEC	Alle LF-Serie Auswerte-elektroniken die eine AC Spannungsversorgung haben	• Ein vom Anwender beigestellter Schalter, muss in der Zuleitung der Spannungsversorgung, nahe der Auswerteelektronik installiert werden.
ATEX Richtlinie 94/9/EC	Auswerteelektronik Modell LFT(1/3/4/6/7)**L****	• Werden Kabelverschraubungen verwendet, sollten diese konform mit Absatz 7.2.6 der EN 50021 sein. • Wenn die Umgebungstemperatur unterhalb –20 °C liegt, verwenden Sie Kabel und Kabelverschraubungen oder Kabelschutzrohrver-schraubungen die für diese Bedingung geeignet sind. • Eine Schutzart von mindestens IP 54 gemäss EN 60529 wird nur dann erreicht, wenn Kabel und Kabelverschraubungen mit IP 54 gemäss EN 60529 verwendet werden.
	Auswerteelektronik Modell LFT(6/7)**L****	• Es kann sein, dass der Gehäusedeckel des Anschlussklemmenraums für die Anschlussklemmen 1–6 kurzzeitig, während des Betriebs, geöffnet werden muss, um die unter Spannung stehenden, Energie begrenzten Schaltkreise zu prüfen oder zu justieren.
	Auswerteelektronik Modell LFT(2/5)**L****	• Werden mehrere Auswerteelektroniken in einem DIN Rack gesteckt und die Umgebungstemperatur über 45 °C liegt, muss der Abstand zwischen den Geräten mindestens 10 mm betragen.
	Auswerteelektronik Modell LFT(2/3/4)*******L***** (alle Sensoren)	• Wenn die Temperatur unter Nennbedingungen höher als 70 °C am Kabel oder Kabelverschraubung ist oder 80 °C am Abzweigpunkt der Leitung, sollte die Nenntemperatur des zwischen Sensor und Auswerteelektronik verwendeten Kabels höher sein als der aktuell gemessene Temperaturwert. • Vorkehrungen sollten getroffen werden, dass die Nennspannung durch Überspannungsstörungen nicht um mehr als 40 % überschritten wird.

Informazione sulla conformità CE – Italian

L'attrezzatura di Micro Motion marcata CE è stata testata con successo in conformità agli standard della Compatibilità Elettromagnetica (EMC) direttiva 89/336/EEC, Direttiva per Bassa Tensione 73/23/EEC, e la Direttiva ATEX 94/9/EC. Questa sezione contiene un breve sommario sui requisiti d'installazione. Per informazioni complete, fare riferimento alle istruzioni in questo manuale, e alle istruzioni ATEX D-IS, disponibili sul internet di Micro Motion.

Tabella C-1 Requisiti di conformità

Direttiva	Applicabile per	Requisito
Compatibiltià Elettromagnetica (EMC) Direttiva 89/336/EEC	Tutti i misuratori Serie LF	• La piastra di montaggio deve essere messa a terra. • Il trasmettitore deve essere messo a terra. • Per il cablaggio usato fra il sensore e il trasmettitore: - Micro Motion fornisce del cavo ad alta qualità in conformità alle norme per la certificazione CE. - Se non si usa il cavo del segnale in dotazione, bisogna usare del cavo totalmente schermato con una schermatura del 100%. - Se sono usati connettori "Circolari", questi devono essere schermati con una schermatura in metallo. Se con dadi di serraggio per la schermatura del cavo. - La schermatura del cavo deve essere terminata a terra.
Direttiva per Bassa Tensione 73/23/EEC	Tutti i trasmettitori Serie LF che usano la potenza AC	• Bisogna installare un interruttore non in dotazione nella linea d'alimentazione in prossimità al trasmettitore.
Direttiva ATEX 94/9/EC	Trasmettitore Modello LFT(1/3/4/6/7)**L****	• Se sono usati degli ingressi del cavo, questi saranno in conformità alla clausola 7.2.6 di EN 50021. • Se la temperatura ambiente è meno di –20 °C, vanno usati cavo e ingressi del cavo o ingressi del condotto adatti a questa condizione. • Il tipo di protezione di almeno IP 54 in conformità a EN 60529 sarà solo raggiunto se sono usati degli ingressi del cavo e del condotto provvedendo IP 54 in conformità a 60529.
	Trasmettitore Modelli LFT(6/7)**L****	• Il coperchio della morsettiera contenendo i terminali 1–6 può essere rimosso per brevi periodi quando i circuiti limitati in corrente alimentati dell'apparato sono in servizio per essere controllati o aggiustati.
	Trasmettitore Modelli LFT(2/5)**L****	• Nel caso che siano posizionati vari trasmettitori su una singola guida DIN e la temperatura ambiente superi 45 °C, la distanza fra le unità deve essere almeno 10 mm.
	Sensore Modelli LFT(2/3/4)**L**** (tutti i sensori)	• Nel caso che la temperatura in condizioni classificate superi 70 °C all'ingresso del cavo o del condotto, o 80 °C al punto di diramazione dei conduttori, il rating della temperatura del cavo usato fra il sensore e il trasmettitore deve essere più alto dei valori di temperatura effettivamente misurati. • Bisogna fare delle provviste per evitare che il voltaggio classificato sia superato da disturbi transitori di più del 40%.

CE-samsvarsinformasjon – Norwegian

Micro Motion-utstyr med CE-merke er testet i henhold til forskriftene i direktiv 89/336/EEC om elektromagnetisk kompatibilitet, lavvoltsdirektiv 73/23/EEC og ATEX-direktiv 94/9/EC. Dette avsnittet gir en kortfattet oversikt over installasjonskravene. For utfyllende informasjon vises det til installasjonsanvisningene tidligere i denne håndboken samt anvisningene for ATEX D-IS (finnes på Micro Motions nettsted).

Tabell C-1 Samsvarskrav

Direktiv	Gjelder	Krav
Direktiv om elektromagnetisk kompatibilitet (EMC) 89/336/EEC	Alle strømnings-målere i LF-serien	• Sensorens festeplate må jordes. • Transmitteren må jordes. • For kabelen som benyttes mellom sensoren og transmitteren: - Micro Motion leverer kabler av høy kvalitet som møter spesifikasjonene for CE-sertifisering. - Dersom du bruker din egen signalkabel, skal du bruke en kabel som er 100 % skjermet over det hele. - Dersom "runde" koplinger brukes, skal disse skjermes med metallvern. Hvis det er aktuelt, skal kabelmuffer med kabelvernsklemme brukes. - Kabelvernet skal jordes.
Lavvoltsdirektivet 73/23/EEC	Alle transmittere i LF-serien som bruker vekselstrøm	• Det må monteres en bryter (skaffes av kunden) på strømforsynings-ledningen i nærhet av transmitteren.
ATEX-direktiv 94/9/EC	Transmittermodellene LFT(1/3/4/6/7)**L****	• Dersom kabelinnføringer brukes, skal disse være i samsvar med paragraf 7.2.6 av EN 50021. • Når omgivelsestemperaturen er under –20 °C, skal det brukes kabel og kabelinnføringer sertifisert for disse forholdene. • En beskyttelse på minst IP 54 i henhold til EN 60529 vil kun oppnås dersom det brukes kabel og kabelinnføring med beskyttelse på IP 54 i henhold til EN 60529.
	Transmittermodellene LFT(6/7)**L****	• Dekselet på koplingshuset for polene 1–6 kan fjernes i korte perioder når enheten er i drift, slik at man kan kontrollere eller justere strømførende energibegrensede kretser.
	Transmittermodellene LFT(2/5)**L****	• Dersom det er flere transmittere på en enkelt DIN-skinne, og omgivelses-temperaturen er over 45 °C, må det være en avstand på minst 10 mm mellom enhetene.
	Sensormodellene LF(2/3/4)*******L***** (alle sensorer)	• Dersom temperaturen under merkede forhold er høyere enn 70 °C ved kabelens eller koplingens inngangspunkt, eller 80 °C ved ledernes forgreningspunkt, skal temperaturmerkingen for kabelen som benyttes mellom sensoren og transmitteren være høyere enn de faktiske, målte temperaturene. • Ta forholdregler, slik at merkespenningen ikke overskrides med mer enn 40 % ved kortvarige svingninger i strømtilførselen.

Informação de cumprimento das normas CE – Portuguese

O equipamento Micro Motion que possua uma etiqueta com a marca CE foi testado com sucesso de acordo com os regulamentos da directiva da Compatibilidade Electro-Magnética (EMC) 89/336/EEC, da directiva de Baixas Tensões 73/23/EEC, e a directiva ATEX 94/9/EC. Esta secção contêm uma breve descrição geral dos requisitos de instalação. Para obter informação completa, consulte as instruções de instalação que se encontram numa secção prévia deste manual, e as instruções ATEX D-IS que se encontram disponíveis na página na Internet da Micro Motion.

Quadro C-1 Requisitos de cumprimento

Directiva	Aplica-se a	Requisito
Directiva da Compatibilidade Electro-Magnética (EMC) 89/336/EEC	Todos os caudalímetros da Série LF	• A placa de montagem do sensor deve estar ligada à terra. • O transmissor tem de estar ligado à terra. • No que diz respeito ao cabo utilizado entre o sensor e o transmissor: - A Micro Motion fornece um cabo de alta qualidade que cumpre as especificações do certificado CE. - Se você disponibilizar o seu próprio cabo de sinal, tem de utilizar um cabo que se encontre completamente revestido com um escudo a 100%. - Se forem utilizados conectores de tipo “Circular”, estes devem ser revestidos com um escudo metálico. Se aplicável, devem ser utilizadas pegas metálicas do cabo que forneçam um bloqueio do escudo do cabo. - O escudo do cabo deve ser concluído com uma ligação à terra.
Directiva de Baixas Tensões 73/23/EEC	Todos os transmissores da Série LF que utilizam corrente CA	• O utilizado tem de instalar um interruptor na linha de fornecimento de corrente perto do transmissor.
Directiva ATEX 94/9/EC	Transmissor modelos LFT(1/3/4/6/7)**L****	• Quando são utilizadas entradas de cabo, estas devem estar em conformidade com os termos da cláusula 7.2.6 da EN 50021. • Quando a temperatura ambiente for inferior a –20°C, devem ser utilizados o cabo e entradas de cabo ou entradas de conduta adequados para estas condições. • Um tipo de protecção de pelo menos IP 54 de acordo com os termos da EN 60529 só será alcançado quando forem utilizadas entradas de cabo ou entradas de conduta que disponibilizem IP 54 de acordo com os termos da EN 60529.
	Transmissores modelos LFT(6/7)**L****	• A tampa do compartimento do terminal que contém os terminais 1–6 pode ser retirada durante períodos curtos de tempo quando o aparelho se encontra em manutenção para fins de inspecção ou ajuste dos circuitos de trabalho com limite de tensão.
	Transmissores modelos LFT(2/5)**L****	• Quando são empilhados múltiplos transmissores numa única guia DIN e a temperatura ambiente é superior a 45°C, as unidades devem ter uma distância de pelo menos 10 mm entre si.
	Sensores modelos LF(2/3/4)*******L***** (todos os sensores)	• Quando a temperatura sob condições atribuídas é superior a 70°C no ponto de entrada do cabo ou da entrada da conduta, ou de 80°C no ponto de ramificação dos condutores, a classificação da temperatura do cabo utilizado entre o sensor e o transmissor irá ser superior aos valores de temperatura medidos de facto. • Serão tomadas medidas para impedir que a tensão atribuída seja ultrapassada por causa de distúrbios temporários superiores a 40%.

Información de cumplimiento CE – Spanish

El equipo de Micro Motion que tiene la marca CE ha pasado con éxito las pruebas de las regulaciones de la directiva de compatibilidad electromagnética (EMC, por sus siglas en inglés) 89/336/EEC, directiva de bajo voltaje 73/23/EEC y directiva ATEX 94/9/EC. Esta sección contiene generalidades breves sobre los requerimientos de instalación. Para obtener información completa, consulte las instrucciones de instalación que se encuentran en una sección anterior en este manual, y las instrucciones ATEX D-IS, disponibles en el sitio web de Micro Motion.

Tabla C-1 Requerimientos de cumplimiento

Directiva	Aplica a	Requerimiento
Directiva de compatibilidad electromagnética (EMC) 89/336/EEC	Todos los medidores de caudal de la serie LF	• La placa de montaje del sensor se debe conectar a tierra física. • El transmisor se debe conectar a tierra física. • Para el cable que se usa entre el sensor y el transmisor: - Micro Motion suministra cable de alta calidad que cumple con las especificaciones para certificación CE. - Si usted proporciona su propio cable de señal, debe usar un cable que esté completamente blindado con una pantalla de 100%. - Si se usan conectores tipo “Circular”, deben estar blindados con una pantalla metálica. Si procede, se deben usar prensaestopas metálicos que proporcionen sujeción de la pantalla del cable. - La pantalla del cable se debe terminar en tierra física.
Directiva de bajo voltaje 73/23/EEC	Todos los transmisores de la serie LF que usen alimentación de CA	• Se debe instalar un interruptor suministrado por el usuario en la línea de la fuente de alimentación cerca del transmisor.
Directiva ATEX 94/9/EC	Modelos de transmisores LFT(1/3/4/6/7)**L****	• Cuando se usan entradas de cable, éstas deben cumplir con la cláusula 7.2.6 de EN 50021. • En un entorno con temperatura ambiental menor a –20 °C, se deben usar cable y entradas de cable o entradas de conducto adecuados para esta condición. • Se logrará un tipo de protección de al menos IP 54 de acuerdo a EN 60529 sólo cuando se use cable y entradas de conducto que proporcionen IP 54 de acuerdo a EN 60529.
	Modelos de transmisores LFT(6/7)**L****	• La cubierta del compartimiento de terminales que contiene los terminales 1–6 se puede quitar por períodos breves cuando el aparato está en servicio para permitir la revisión o ajuste de los circuitos energizados limitados por energía.
	Modelos de transmisores LFT(2/5)**L****	• Cuando se ponen múltiples transmisores en un solo carril DIN y la temperatura ambiental es superior a 45 °C, las unidades deben estar separadas cuando menos 10 mm.
	Modelos de transmisores LF(2/3/4)*******L***** (todos los sensores)	• Cuando la temperatura bajo las condiciones clasificadas es superior a 70 °C en el punto de entrada de conducto o de cable, u 80 °C en el punto de ramificación de los conductores, el valor nominal de temperatura del cable usado entre el sensor y el transmisor debe ser mayor que los valores de temperatura realmente medidos. • Se deben tomar las precauciones necesarias para evitar que se exceda el voltaje nominal debido a disturbios transitorios de más de 40%.

CE överensstämmelseinformation – Swedish

Micro Motion-utrustning med CE-märke har framgångsrikt testats mot föreskrifterna i EMC-direktivet 89/336/EEC, lågspänningsdirektivet 73/23/EEC och ATEX-direktivet 94/9/EC. Detta avsnitt innehåller en kort översikt om installationskraven. För fullständig information se installationsanvisningarna tidigare i denna handbok och ATEX D-IS-anvisningarna som finns på Micro Motions webbplats.

Tabell C-1 Överensstämmelsekrav

Direktiv	Gäller för	Krav
Elektromagnetisk kompatibilitet (EMC) direktiv 89/336/EEC	Alla LF-seriens flödesmätare	• Sensorns fästplatta måste vara jordad. • Transmittern måste vara jordad. • För kabeln som används mellan sensorn och transmittern: - Micro Motion levererar högkvalitetskabel som uppfyller kraven för CE-godkännande. - Om du tillhandahåller din egen signalkabel skall du använda en kabel som är fullständigt skärmad med en 100 % skärm. - Om ”cirkulär”-typskontakter används skall de vara skärmade med metallskärm. Om tillämpligt måste kabelförskruvningar med metallskärmsklämmor användas. - Kabelskärmen skall avslutas mot jord.
Lågspännings-direktivet 73/23/EEC	Alla LF-seriens transmittrar som använder växelström	• En användarlevererad brytare måste installeras i strömförsörjningsledningen nära transmittern.
ATEX-direktiv 94/9/EC	Transmittermodeller LFT(1/3/4/6/7)**L****	• När kabelingångar används skall de uppfylla artikel 7.2.6 i EN 50021. • I en omgivningstemperatur lägre än –20 °C, skall kabel och kabelingångar eller skyddsrör lämpliga för detta tillstånd användas. • En typ av skyddskapsling på minst IP 54 enligt EN 60529 uppnås bara när kabel- och skyddsrörsingångar som ger IP 54 enligt EN 60529 används.
	Transmittermodeller LFT(6/7)**L****	• Locket till kopplingsplinten med kontakterna 1–6 kan tas bort korta perioder när apparaten servas för att tillåta kontroll eller justering av strömsatta energibegränsade kretsar.
	Transmittermodeller LFT(2/5)**L****	• När flera transmittrar är staplade på en enkel DIN-skena och omgivningstemperaturen är över 45 °C, måste enheterna sitta minst 10 mm från varandra.
	Sensormodeller LF(2/3/4)*******L***** (alla sensorer)	• När temperaturen under nominella prestanda är högre än 70 °C vid kabel- eller skyddsrörsingången eller 80 °C vid ledarnas förgreningspunkt skall temperaturmärkdata för kabeln som används mellan sensor och transmitter vara högre än de faktiskt uppmätta temperaturvärdena. • Åtgärder skall vidtas för att förhindra att märkspänningen överskrids av transientstörningar på mer än 40 %.

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Micro Motion Inc. USA
Worldwide Headquarters
7070 Winchester Circle
Boulder, Colorado 80301
T (303) 527-5200
(800) 522-6277
F (303) 530-8459

Micro Motion Europe
Emerson Process Management
Wiltonstraat 30
3905 KW Veenendaal
The Netherlands
T +31 (0) 318 495 670
F +31 (0) 318 495 689

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 0800 966 180
F 0800 966 181

Micro Motion Japan
Emerson Process Management
Shinagawa NF Bldg. 5F
1-2-5, Higashi Shinagawa
Shinagawa-ku
Tokyo 140-0002 Japan
T (81) 3 5769-6803
F (81) 3 5769-6843

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