

## Quick Reference Guide

P/N 20000794, Rev. D

February 2003

# Model RFT9739 Transmitter Installation Instructions

For online technical support, use the EXPERT<sub>2</sub><sup>™</sup> system at [www.expert2.com](http://www.expert2.com). To speak to a customer service representative, call the support center nearest you:

- In the U.S.A., phone 1-800-522-MASS (1-800-522-6277)
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- In the U.K., phone 0800 - 966 180 (toll-free)
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## BEFORE YOU BEGIN

### About these instructions

This quick reference guide explains basic installation guidelines for Micro Motion® RFT9739 transmitters.

For more information on I.S. applications, refer to Micro Motion UL, CSA, SAA, or ATEX installation instructions.

For complete transmitter instructions about configuration, maintenance, and service, refer to the instruction manual shipped with the transmitter.

### European installations

Micro Motion products comply with all applicable European directives when properly installed in accordance with the instructions in this quick reference guide. Refer to the EC declaration of conformity for directives that apply to a specific 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](http://www.micromotion.com/atex) or through your local Micro Motion support center.

#### WARNING

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

For information about hazardous applications, refer to the Micro Motion UL, CSA, SAA, or ATEX installation instructions, shipped with the transmitter or available from the Micro Motion website.

**⚠ WARNING**

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

Install transmitter and complete all wiring before supplying power.

**⚠ WARNING**

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

Follow all instructions to ensure transmitter will operate correctly.

## **Installation options**

RFT9739 rack-mount and field-mount transmitters may be connected to Micro Motion® Model D, DL, DT, ELITE, and F-Series sensors with a Micro Motion 9-wire cable.

### **STEP 1. Determining a location**

Choose a location for the transmitter based on the requirements described on page 2.

#### **Environmental requirements**

For rack-mount and field-mount transmitters with local displays, install the transmitter where ambient temperature is between +32 and +122°F (0 and +50°C). For field-mount transmitters without local displays, install the transmitter where ambient temperature remains between -22 and +131°F (-30 and +55°C).

## Power source

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

- Rack-mount transmitter

The AC transmitter accepts an 110/115 or 220/230 VAC power supply. The DC transmitter accepts a 12-30 VDC power supply.

- Field-mount transmitter

The AC transmitter accepts a 85 to 250 VAC power supply. The DC transmitter accepts a 12-30 VDC power supply.

## Flowmeter cable lengths

The maximum cable length between the sensor and the transmitter is 1000 feet (300 meters).

## STEP 2. Mounting the transmitter

### Rack-mount transmitter

The rack-mount RFT9739 meets DIN standard 41494, 19-inch configuration for control-room equipment. The 19" cassette fits in a 19" rack with a Eurocard 220mm depth. Transmitter dimensions are shown in Figure 1.

When installing multiple transmitters in a single rack, 15 watts of forced-air cooling, per transmitter, is required. Refer to the manual that was shipped with the transmitter for details on spacing requirements.

### CAUTION

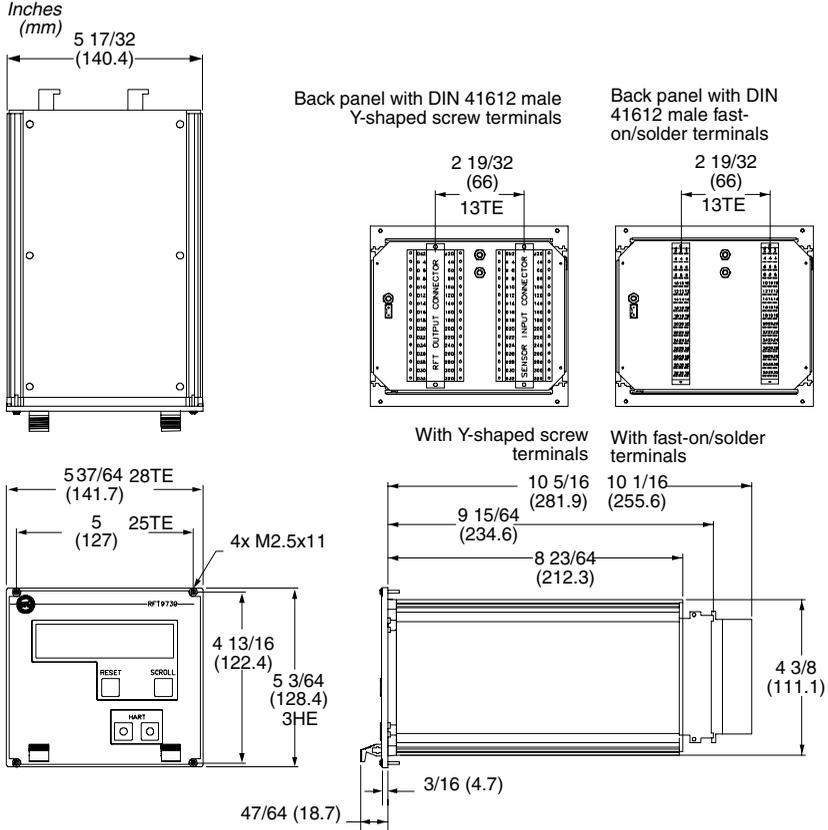
**Failure to maintain an ambient temperature below maximum temperature rating could result in operational failure and product damage.**

Install transmitter in an area with sufficient air flow to keep the ambient temperature below +122°F (+50°C).

Connectors CN1 and CN2 are available in two types.

- The standard rectangular configuration accommodates fast-on (wire-pin) or soldered connections.
- The optional Y-shaped connectors have screw terminals, which accommodate wires as large as 14 AWG (2,5 mm<sup>2</sup>).

**Figure 1. Rack-mount RFT9739 dimensions**



## Field-mount transmitter

To install a field-mount transmitter, follow the guidelines below.

- Install conduit that allows a complete seal with the conduit openings.
- If possible, orient the transmitter with its conduit openings pointed downward. If this is not possible, seal the conduit to prevent condensation and other moisture from entering the housing.
- If the transmitter has a display, the display will be right-side-up only if the transmitter is oriented with its conduit openings pointed downward.

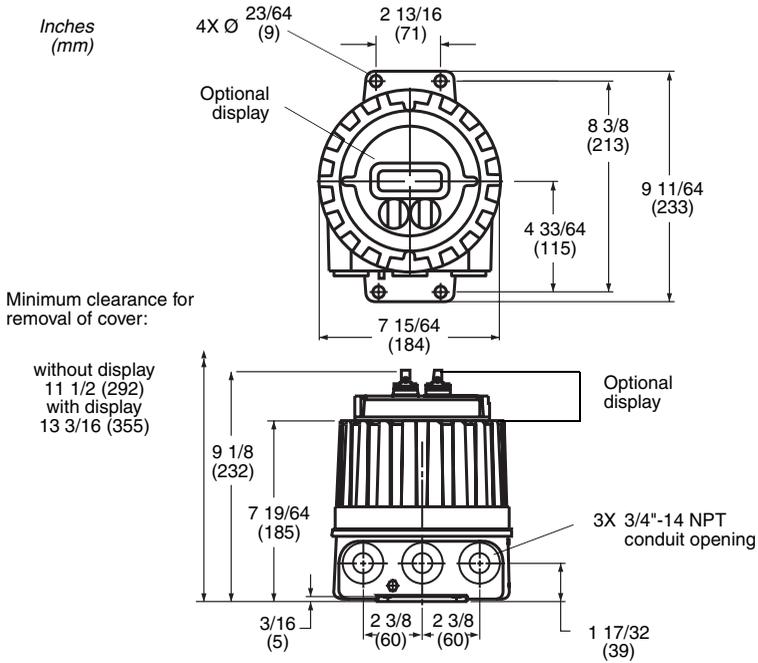
To wall mount the field-mount transmitter, refer to Figure 2 and the following guidelines:

- Use four 5/16-inch diameter (M8) bolts (not included).
- Do not secure bolts to separate girders, beams, wall studs, etc., which can move independently.

To pole mount the field-mount model, refer to Figure 2 and the following guidelines:

- Pole must extend at least 1 foot (300 mm) from an immobile base, and be no more than 2 inches (50 mm) in diameter.
- Use two 5/16-inch (M8) U-bolts for 2-inch pipe, and four 5/16-inch (M8) nuts (not included), suitable for the environment.

**Figure 2. Field-mount RFT9739 dimensions**



### STEP 3. Wiring the transmitter to the sensor

#### WARNING

**Failure to comply with requirements for intrinsic safety in a hazardous area could result in an explosion.**

Sensor wiring is intrinsically safe.

- Keep intrinsically safe sensor wiring separated from power supply wiring and output wiring.
- For intrinsically safe sensor installations, use this document with Micro Motion UL, CSA, SAA, or ATEX installation instructions.
- For hazardous area installations in Europe, refer to standard EN 60079-14 if national standards do not apply.
- For field-mount transmitters, make sure the safety barrier partition is in place before operating the transmitter. See Figure 5.

#### CAUTION

**Improper installation of cable or conduit could cause measurement error or flowmeter failure.**

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

- Terminal blocks may be unplugged for easier installation of wiring.
- Install cable and wiring to meet local code requirements.
- A switch may be installed in the power supply line. For compliance with low-voltage directive 73/23/EEC, a switch is required.
- Do not install power cable in the same conduit or cable tray as flowmeter cable or output wires.



## Field-mount transmitter

### CAUTION

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

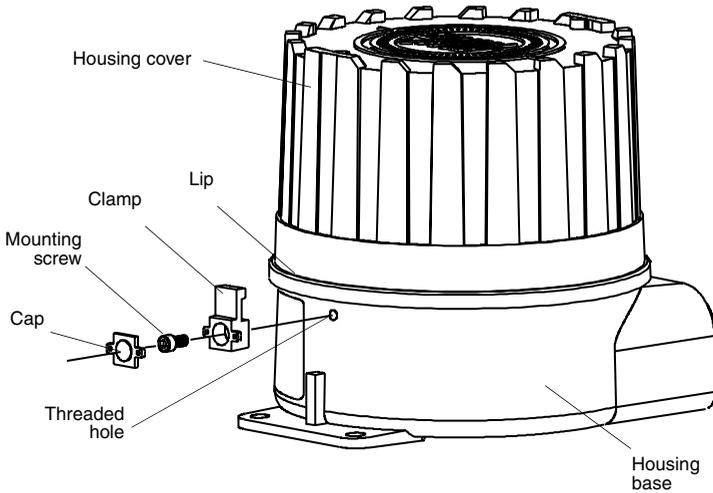
- Ensure integrity of gaskets and o-rings.
- Do not mount the transmitter with the conduit openings pointing upward.
- Install drip legs in conduit or cable.
- Seal all conduit openings.
- Fully tighten the transmitter cover.

To comply with the ATEX directive for hazardous area installations in Europe, adhere to the following conditions for safe use:

- Use 3/4"-NPT cable glands or conduit fittings, rated flameproof for EEx d IIC areas and certified by an authorized test station. Flameproof glands supplied by Micro Motion meet these requirements.
- Conduit openings that are not used should be sealed with blanking plugs of type PLG 2.
- For installation in a nonhazardous area, cable glands or conduit fittings that do not carry a flameproof rating are acceptable.

An ATEX-compliant RFT9739 includes a lockout clamp on the transmitter housing. See Figure 4. The clamp adds secondary protection against accessing the power-supply terminals, and is required to meet the ATEX directive.

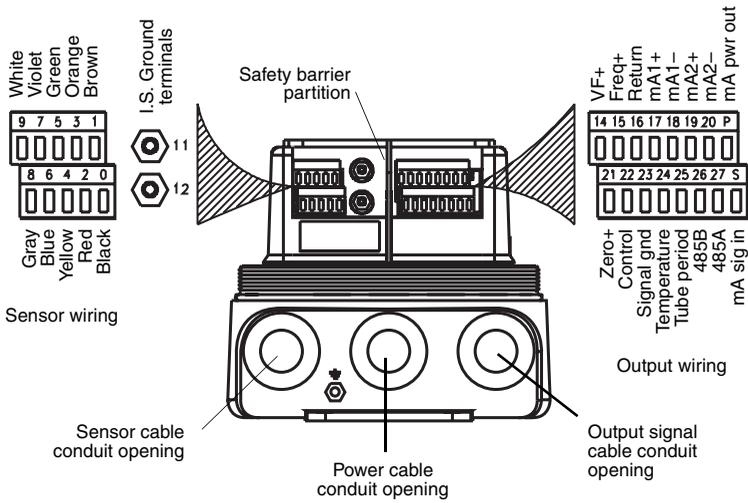
**Figure 4. Lockout clamp for ATEX-approved transmitters**



Follow the steps below to wire the transmitter to the sensor.

1. Remove the transmitter housing cover by unscrewing it from the transmitter base. (Transmitters approved as ATEX require removal of the lockout clamp before the transmitter cover can be removed.)
2. Unlatch the clear plastic module cover from the safety barrier partition.
3. Remove the safety barrier partition to expose the transmitter power terminals. See Figure 5.
4. Prepare the cable and follow all guidelines according to the instructions in Micro Motion's *9-Wire Flowmeter Cable Preparation and Installation Guide*.
5. Insert the stripped ends of the individual wires into the terminal blocks. No bare wires should remain exposed.
  - At the sensor, connect wiring inside the sensor junction box. Refer to the sensor instruction manual for details.
  - At the transmitter, connect wiring to the transmitter's intrinsically safe terminals 0-9 as indicated in Figure 5.
6. Tighten screws to hold wires in place.

**Figure 5. Field-mount RFT9739 sensor and output terminals**



**STEP 4. Grounding the transmitter**

**⚠ WARNING**

**Failure to comply with requirements for intrinsic safety if the sensor is installed in a hazardous area could result in an explosion.**

- The transmitter must be properly grounded. Follow the instructions below to ground the transmitter if the sensor is installed in a non-hazardous area.
- For intrinsically safe sensor installations, use the appropriate Micro Motion UL, CSA, SAA, or ATEX installation instructions.

If national standards are not in effect, follow these grounding guidelines for both rack-mount and field-mount transmitters.

- Use copper wire, 14 AWG (2,5 mm<sup>2</sup>) or larger wire size for grounding.
- Keep all ground leads as short as possible, less than 1 ohm impedance.

## **Rack-mount transmitter**

If the sensor is installed in a hazardous area, use the appropriate Micro Motion UL, CSA, SAA, or ATEX installation instructions.

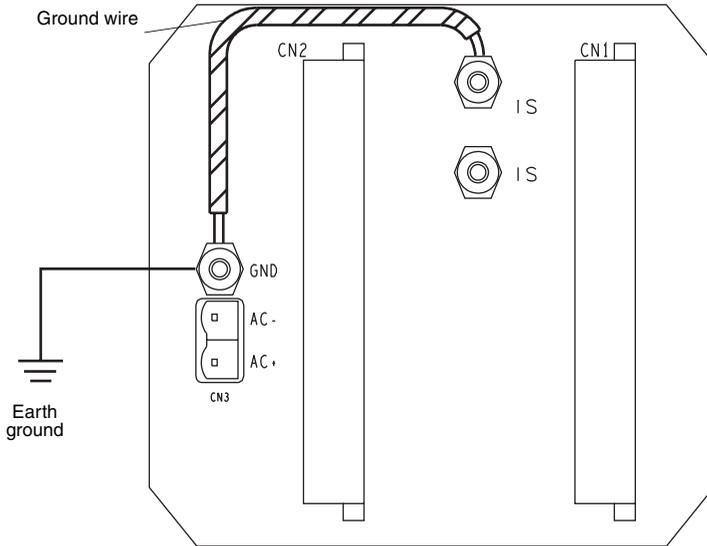
For installations in areas outside of Europe, if national standards are not in effect, refer to Figure 6. Adhere to the general guidelines on page 11 and the following guidelines for grounding:

- Connect the I.S. ground terminals directly to the power supply ground terminals.
- Connect power supply ground directly to earth ground.
- Follow plant standards instead of this standard, if a separate high-integrity intrinsically safe ground scheme is used.

For installations in Europe, refer to Figure 6. Adhere to the general guidelines on page 11 and the following guidelines for grounding:

- A factory-installed ground wire, connecting the I.S. ground and power supply ground terminals, must remain in place.
- Connect power supply ground directly to earth ground.
- Follow plant standards instead of this standard, if a separate high-integrity intrinsically safe ground scheme is used.
- To achieve potential equalization and comply with ATEX standards for hazardous area installations in Europe, connect the power ground terminal to the appropriate ground terminals within the hazardous area, using a potential equalizing line.
- Use standard EN 60079-14 as a guideline.

**Figure 6. Rack-mount RFT9739 grounding**



### **Field-mount transmitter**

For hazardous area installations, use the appropriate Micro Motion UL, CSA, SAA, or ATEX installation instructions.

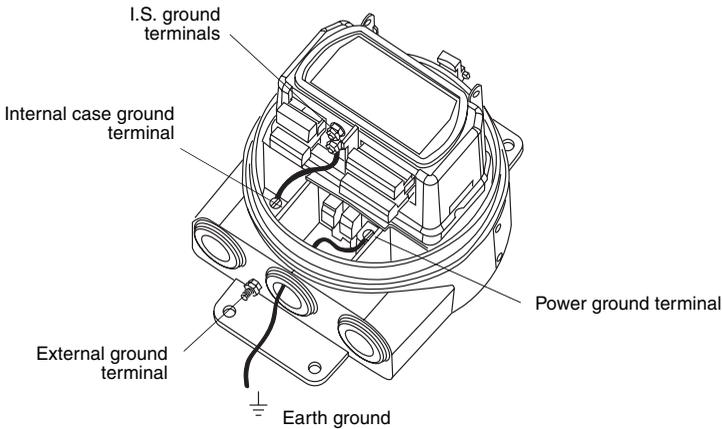
For installations in areas outside of Europe, if national standards are not in effect, refer to Figure 7. Adhere to the general guidelines on page 11 and the following guidelines for grounding:

- Connect I.S. ground terminals directly to internal case ground terminal.
- Connect ground lead from power ground terminal directly to earth ground.
- Follow plant standards instead of this standard, if a separate high-integrity intrinsically safe ground scheme is used.

For installations in Europe, refer to Figure 7. Adhere to the general guidelines on page 11 and the following guidelines for grounding:

- A factory-installed ground wire, connecting the I.S. ground and internal case-ground terminals, must remain in place.
- Connect ground lead from power ground terminal directly to earth ground.
- Follow plant standards instead of this standard, if a separate high-integrity intrinsically safe ground scheme is used.
- To achieve potential equalization and comply with ATEX standards for hazardous area installations in Europe, connect the external ground terminal to the appropriate ground terminals within the hazardous area, using a potential equalizing line.
- Use standard EN 60079-14 as a guideline.

**Figure 7. Field-mount RFT9739 grounding**



## STEP 5. Supplying power to the transmitter

### Rack-mount transmitter

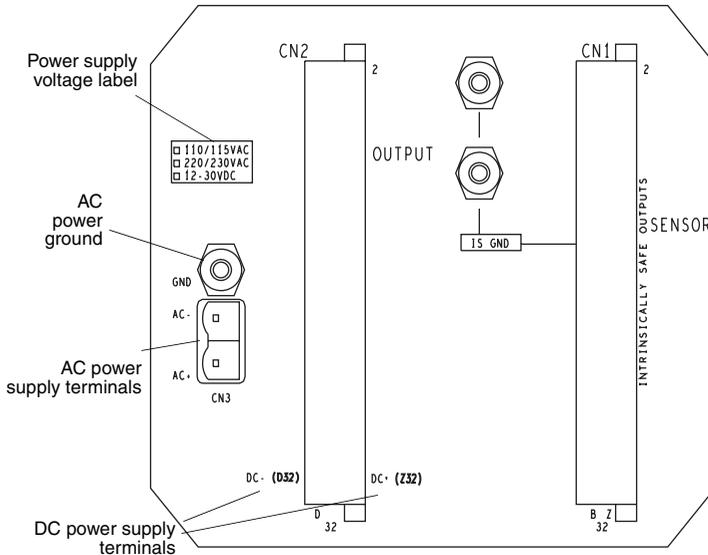
To make power supply connections:

Connect the power supply cable to the power terminals indicated in Figure 8. The transmitter can accept a 110/115 or 220/230 VAC power supply. Refer to the label in the upper corner on Figure 8.

- Connect AC power to connector CN3; or DC power to CN2, terminals D32 and Z32.
- Ground power at the ground lug (GND) above CN3.

Any RFT9739 rack-mount transmitter can accept a DC power supply, whether or not the back panel indicates the transmitter has been configured for AC power. To change the AC power supply voltage from the configured voltage, refer to the manual that was shipped with the transmitter.

**Figure 8. Rack-mount RFT9739 back panel connections**

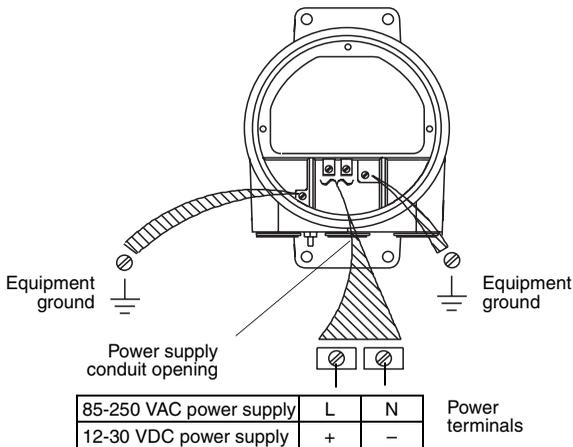


## Field-mount transmitter

To make power supply connections:

1. Connect cable gland or sealed end of conduit to the **middle** conduit opening in the transmitter housing (see Figure 5). Ensure fittings are properly sealed.
2. Connect the power cable to the two labeled terminals, as indicated in Figure 9. If the terminals are labeled "L" (line) and "N" (neutral), install an 85 to 250 VAC power supply. If the terminals are labeled "+" (positive) and "-" (negative), install a 12 to 30 VDC power supply.

**Figure 9. Field-mount RFT9739 power terminals**



### STEP 6. Wiring the transmitter outputs

The following guidelines apply to both rack-mount and field-mount transmitters.

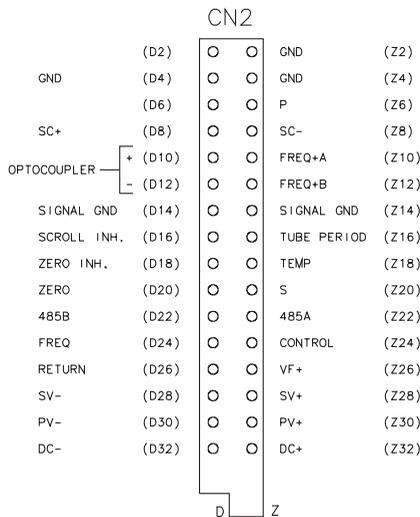
- Output wiring requires twisted pair, shielded cable.
- Maximum wire length is 500 feet for 22 AWG wire (150 meters for 0,3 mm<sup>2</sup> wire), or 50 feet for 28 AWG wire (15 meters for 0,1 mm<sup>2</sup> wire).

However, these distances are estimates only. Prior to commissioning the transmitter, a loop-test is recommended as a means for determining whether or not output signals are being received correctly at the receiving device.

### Rack-mount transmitter

To make transmitter output connections, follow the general guidelines above and connect output wires to terminals CN2, as indicated in Figure 10 and in Table 1.

**Figure 10. Output terminals**



**Table 1. Rack-mount transmitter output wiring terminal designations**

<b>CN2 terminal number</b>	<b>Function</b>	<b>CN2 terminal number</b>	<b>Function</b>
D4, Z2 and Z4	Grounds	Z6	DC power to pressure or DP transmitter
D10 and D12	Optocoupler output	Z10 and D26	Dual-channel (quadrature) frequency output, channel A
D14 and Z14	Signal ground	Z12 and D26	Dual-channel (quadrature) frequency output, channel B
D16 and D14	Scroll inhibit	Z16 and Z14	Tube period output
D18 and D14	Zero inhibit	Z18 and Z14	Temperature output
D20 and D26	Remote zero input	Z20	mA input from pressure or DP transmitter
D22 and Z22	RS-485 I/O	Z24 and D26	Control output
D24 and D26	Frequency/pulse output	Z26	Frequency output, DC supply voltage
D28 and Z28	Secondary variable (SV) mA output		
D30 and Z30	Primary variable (PV) mA output		
D32 and Z32	DC power-supply input		

### Field-mount transmitter

To make transmitter output connections, follow the general guidelines on page 16 and the guidelines below.

- Terminate cable shielding at gland or conduit fitting. It is not necessary to ensure 360° termination of shielding. Do not terminate shield inside transmitter housing.
- Connect cable gland or sealed end of conduit to the **right** conduit opening in the transmitter housing (see Figure 5). Ensure fittings are properly sealed.
- Connect output wires to terminals P, S, and 14 through 27, as indicated in Figure 5 and in Table 2.

**Table 2. Field-mount transmitter output wiring terminal designations**

<b>Terminal number</b>	<b>Function</b>
14	Frequency output, DC supply voltage
15 and 16	Frequency/pulse output
17 and 18	Primary variable (PV) mA output
19 and 20	Secondary variable (SV) mA output
21 and 16	Remote zero input
22 and 16	Control output
23	Signal ground
24 and 23	Temperature output
25 and 23	Tube period output
26 and 27	RS-485 I/O
P	DC power to pressure or DP transmitter
S	mA input from pressure or DP transmitter

After making wiring connections:

1. Put the safety barrier partition back in place. See Figure 5 on page 11.
2. Latch the clear plastic module cover to the safety barrier partition.
3. Reinstall the transmitter housing cover, tightening it completely to seal the housing.

### **STEP 7. Starting the transmitter**

For startup procedures, see the instruction manual that is shipped with the transmitter.







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