PanaFlow™ LZ

User's manual

910-316 Rev. A

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Panametrics

a Baker Hughes business

[no content intended for this page]

Product registration

Thank you for purchasing a model PanaFlow™ LZ from Panametrics. Please register your product at https://info.bakerhughesds.com/New-product-registration-LP.html product support such as the latest software/firmware upgrades, product information and special promotions.

Services

Panametrics provides customers with an experienced staff of customer support personnel ready to respond to technical inquiries, as well as other remote and on-site support needs. To complement our broad portfolio of industry-leading solutions, we offer several types of flexible and scalable support services including: training, Product repairs, service Agreements and more. Please visit change to: https://www.bakerhughesds.com/panametrics/flow-measurement/flow-measurement-services for more details.

Terms and conditions

Panametrics' sales terms and conditions for your recent purchase of a Panametrics product, including the applicable product warranty, can be found on our website at the following link: https://www.bakerhughesds.com/sales-terms-conditions.

Typographical conventions

Note: These paragraphs provide information that provides a deeper understanding of the situation, but is not essential to the proper completion of the instructions.

IMPORTANT:

These paragraphs provide information that emphasizes instructions that are essential to proper setup of the equipment. Failure to follow these instructions carefully may cause unreliable performance.

CAUTION!

This symbol indicates a risk of potential minor personal injury and/or severe damage to the equipment, unless these instructions are followed carefully.

WARNING!

This symbol indicates a risk of potential serious personal injury, unless these instructions are followed carefully.

Safety issues

WARNING!

It is the responsibility of the user to make sure all local, county, state and national codes, regulations, rules and laws related to safety and safe operating conditions are met for each installation.

Attention European customers!

To meet CE marking requirements for all units intended for use in the EU, all electrical cables must be installed as described in this manual.

Auxiliary equipment

Local safety standards

The user must make sure that he operates all auxiliary equipment in accordance with local codes, standards, regulations, or laws applicable to safety.

Working area

WARNING!

Auxiliary equipment may have both manual and automatic modes of operation. As equipment can move suddenly and without warning, do not enter the work cell of this equipment during automatic operation, and do not enter the work envelope of this equipment during manual operation. If you do, serious injury can result.

WARNING!

Make sure that power to the auxiliary equipment is turned OFF and locked out before you perform maintenance procedures on this equipment.

Qualification of personnel

Make sure that all personnel have manufacturer-approved training applicable to the auxiliary equipment.

Personal safety equipment

Make sure that operators and maintenance personnel have all safety equipment applicable to the auxiliary equipment. Examples include safety glasses, protective headgear, safety shoes, etc.

Unauthorized operation

Make sure that unauthorized personnel cannot gain access to the operation of the equipment.

Environmental compliance

RoHS

The PanaFlow™ LZ fully complies with RoHS regulations (Directive 2011/65/EU).

Waste Electrical and Electronic Equipment (WEEE) directive

Panametrics is an active participant in Europe's Waste Electrical and Electronic Equipment (WEEE) take-back initiative (Directive 2012/19/EU).

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

Please visit https://www.bakerhughesds.com/health-safetyand-environment-hse for take-back instructions and more information about this initiative.

1.0 Contents

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2.0 Introduction

To ensure safe and reliable operation of the PanaFlow LZ flow meter system, it must be installed in accordance with established guidelines. Those guidelines are discussed in this manual and in the flow transmitter Manual.

IMPORTANT:

The PanaFlow LZ flow meter system may be supplied with a variety of Panametrics flow transmitters (XMT1000, XMT910, XMT900, XMT868i, etc.). Be sure to refer to the User's Manual for your specific flow transmitter.

Attention!

Because the PanaFlow LZ system has the flexibility to use several different Panametrics flow transmitters, the photographs used in this manual may appear slightly different from your system. However, the basic instructions are valid for all PanaFlow LZ systems.

WARNING!

The PanaFlow LZ flow meter can measure the flow rate of many fluids, some potentially hazardous. The importance of proper safety practices cannot be overemphasized.

WARNING!

Be sure to follow all applicable local safety codes and regulations for installing electrical equipment and working with hazardous fluids or flow conditions. Consult company safety personnel or local safety authorities to verify the safety of any procedure or practice.

Attention!

To meet CE Mark requirements, all cables must be installed as described in the flow transmitter User's Manual. CE Mark compliance is required for all systems intended for use in EU countries.

3.0 Unpacking the PanaFlow LZ System

Before removing the PanaFlow LZ system from the crate, please inspect the flow meter. Before discarding any of the packing materials, account for all components and documentation listed on the packing slip. The discarding of an important item along with the packing materials is all too common. If anything is missing or damaged, contact Panametrics Customer Care immediately for assistance.

3.1 Identification

The PanaFlow LZ meter has up to three separate labels for identification, depending on its configuration. The system is mounted as a single unit.The six keys on the magnetic keypad are used to program the XMT1000:

3.2 Lifting the PanaFlow LZ System

Figure 1 below indicates the proper way to attach the lifting straps to any Panametrics flow meter system.

Attention!

Because the PanaFlow LZ system has the flexibility to use several different Panametrics flow transmitters, the photographs used in this manual may appear slightly different from your system. However, the basic instructions are valid for all PanaFlow LZ systems.

WARNING!

This is the only approved way to lift a PanaFlow system into position in the pipeline. Never lift the system by the flow transmitter mounted on top of the flowcell.

Figure 1: Lifting a typical Panametrics PanaFlow System

4.0 Site considerations

4.1 Local mounting

The flow transmitter accuracy is affected by the flowcell location in the process piping and on the orientation of the transducers. Thus, in addition to accessibility for maintenance, adhere to the following installation guidelines:

- Locate the flowcell so that there are at least 10 pipe diameters of straight, undisturbed flow upstream and 5 pipe diameters of straight, undisturbed flow downstream from the measurement point (see Figure 2 below). Undisturbed flow means avoiding sources of turbulence in the fluid (e.g., valves, flanges, expansions, elbows, etc.), avoiding swirl, and avoiding cavitation.

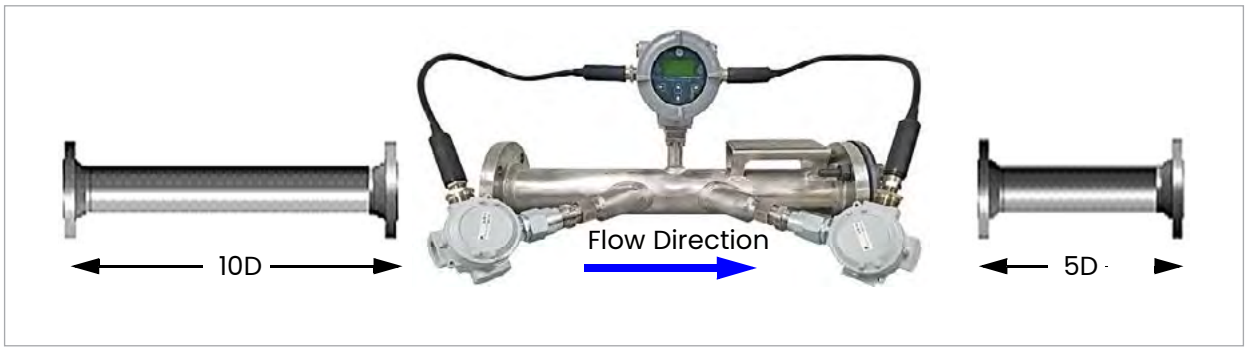

Figure 2: Minimum straight run pipe requirements

- Locate the transducers on a common axial plane along the pipe. Also, locate them on the side of the pipe instead of on the top or the bottom, because the top of the pipe tends to accumulate gas and the bottom tends to accumulate sediment. Either condition will cause unwanted attenuation of the ultrasonic signals. There is no similar restriction with vertical pipes, as long as the fluid flow is upward to prevent free falling of the fluid or a less than full pipe (see *Figure 3* below).

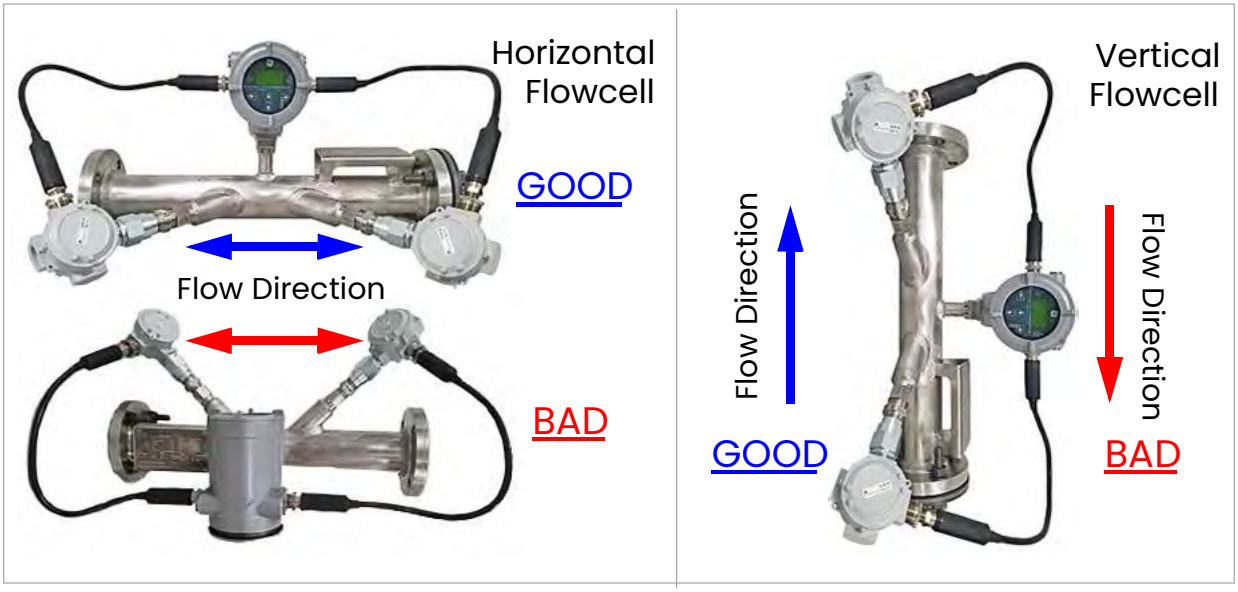

Figure 3: Good and bad flowcell/transducer orientations

CAUTION!

Do not place thermal insulation on or around the transducers, the junction boxes, or the meter electronics. The transducer and junction box act as a heat sink that protects the transducer from high and low temperatures.

4.2 Remote mounting

The standard flow transmitter enclosure is a powder-coated, aluminum, IP67 explosion-proof enclosure. Typically, the enclosure is mounted as close as possible to the transducers. When choosing a site for a remote-mount installation, which is recommended for process temperatures exceeding 150°C, make sure the location permits easy access to the enclosure for programming, maintenance and service.

Attention!

For compliance with the European Union's Low Voltage Directive, this unit requires an external power disconnect device such as a switch or circuit breaker. The disconnect device must be marked as such, clearly visible, directly accessible, and located within 1.8 m (6 ft) of the transmitter.

4.3 Cable lengths

Locate the flow transmitter as close as possible to the transducers. The maximum distance from the transducers for remote mounting is 1000 ft (300 m) using RG-62 coaxial cable or equivalent. If longer distances are required, consult the factory for assistance.

4.4 Transducer cables

When installing the transducer cables, always observe established standard practices for the installation of electrical cables. Do not route transducer cables alongside high amperage AC power lines or any other cables that could cause electrical interference. Also, protect the transducer cables and connections from the weather and corrosive atmospheres, and be sure to follow the manufacturer's installation guidelines if cable glands are provided.

4.5 Insulation

Do not place thermal insulation on or around the transducer locations or the flow transmitter. The enclosures act as heat sinks that protect against high and low temperatures.

4.6 Vibration exposure considerations

Whenever possible, install the flow transmitter in a location isolated from vibrations. Avoid installing it near equipment that generates low-frequency, high-energy random vibrations.

4.7 Sunlight exposure

The installer should consider and limit exposure of the flow transmitter to direct sunlight. Sunshades should be utilized in extreme environments.

5.0 Installing cable glands

When wiring the PanaFlow LZ system in accordance with the instructions in the flow transmitter User's Manual, it is essential that the cable glands be properly installed. To accomplish this, carefully complete the following steps:

WARNING!

Failure to properly install the cables in the glands will compromise the environmental ratings of the PanaFlow LZ system.

Note: These instructions apply to all installations using the Panametrics 704-861, 704-862, and 704-863 cable assemblies.

1. Remove the *Rubber Boot* from the cable gland and slide it back over the cable (see *Figure 4* below).

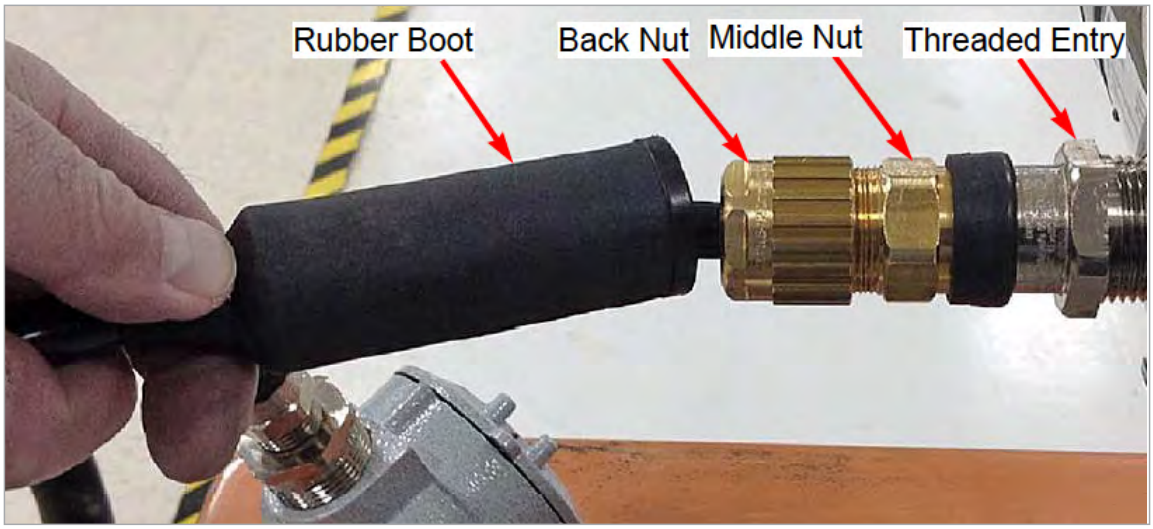

Figure 4: Removing the rubber boot

2. Disassemble the *Cable Gland* (see *Figure 5* below). However, DO NOT try to separate the pieces of the Armor Clamp that secures the cable armor, as these pieces are permanently assembled.

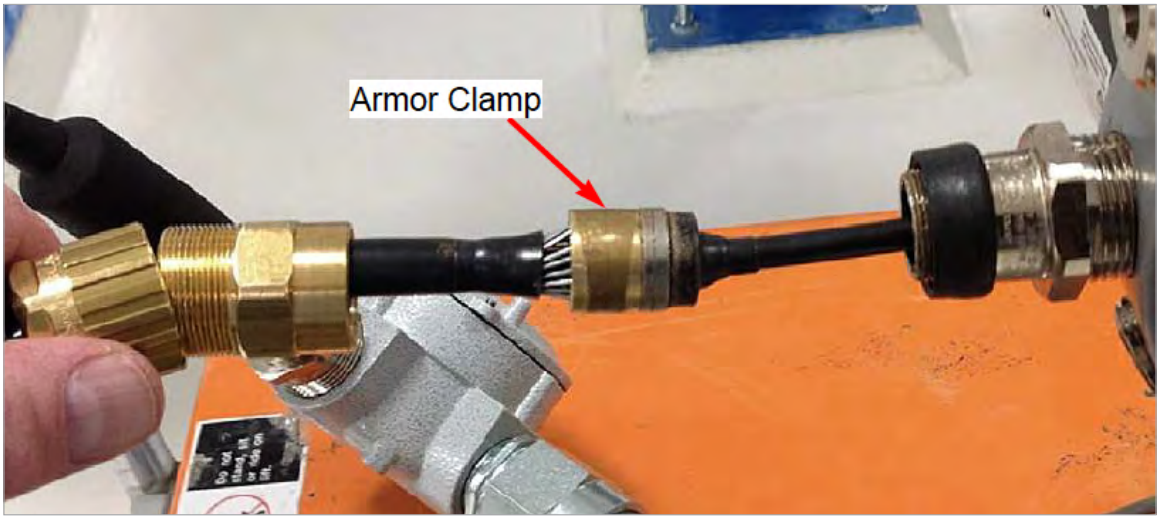

Figure 5: Disassembling the cable gland

5.0 Installing cable glands (cont.)

3. Tighten the Threaded Entry (see *Figure 6* below) with a wrench to form a permanent joint.

Figure 6: Tightening the threaded entry

4. Insert the *Coaxial Cable* into the *Threaded Entry* (see *Figure 7* below).

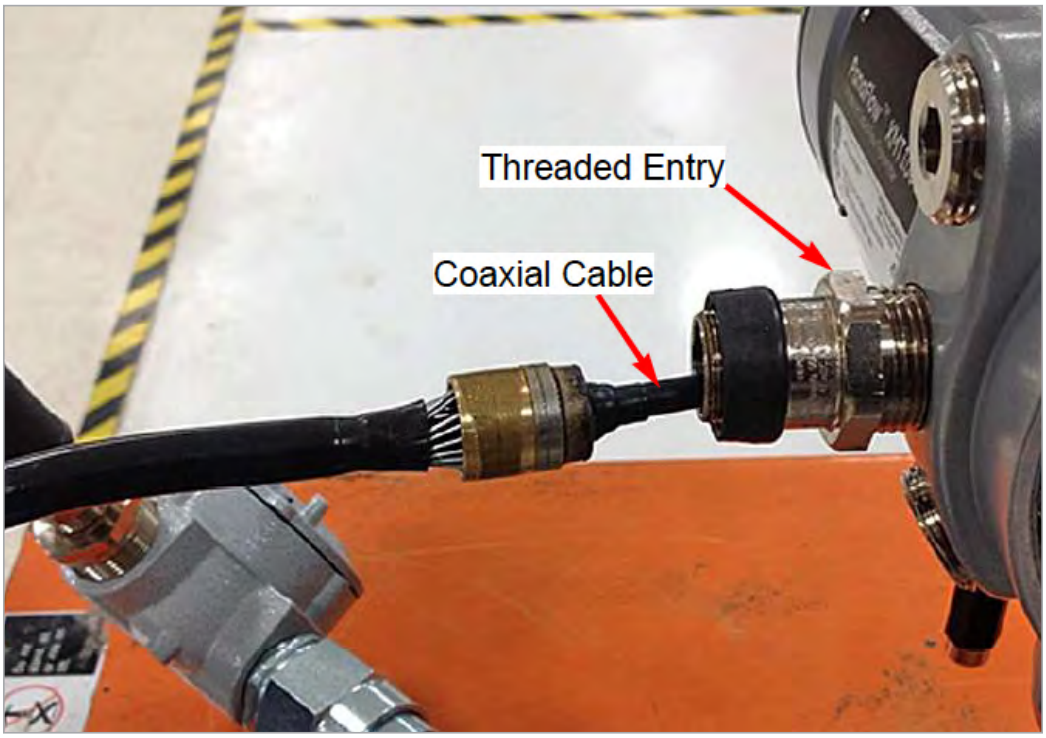

Figure 7: Inserting the coaxial cable into the threaded entry

5.0 Installing cable glands (cont.)

5. Push the *Coaxial Cable* into the gland until the *Armor Clamp* is fully inserted into the *Threaded Entry* section. (see *Figure 8* below).

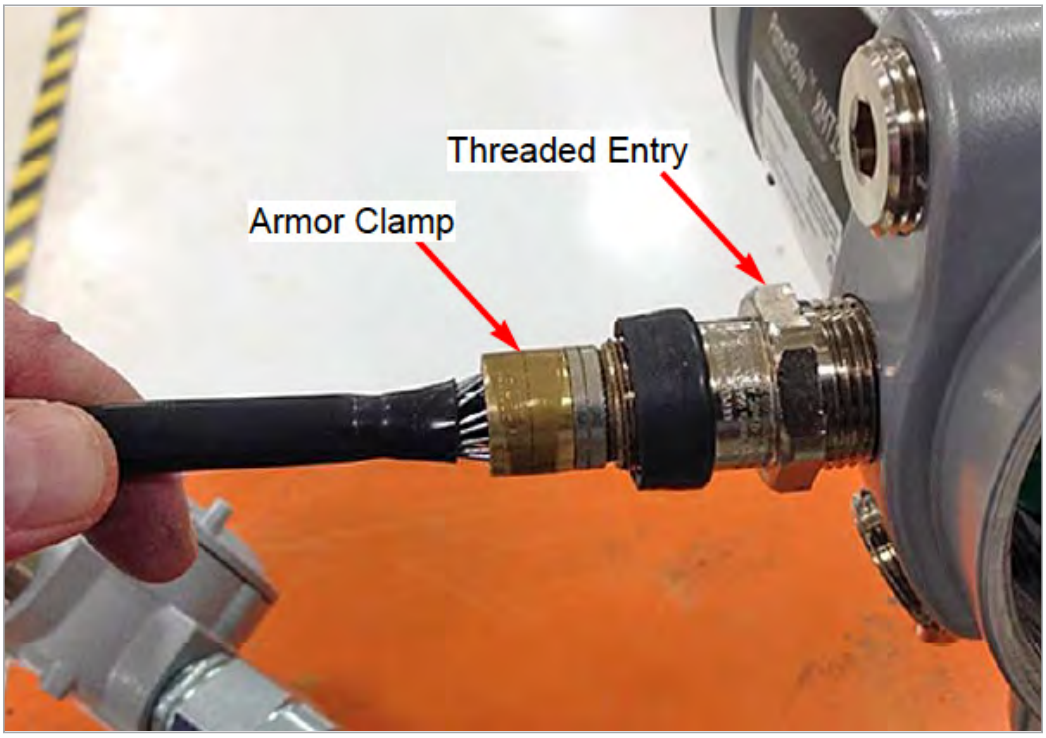

Figure 8: Inserting the armor clamp into the gland

6. Screw the *Middle Nut* onto the cable gland to secure the clamped section (see *Figure 9* below).

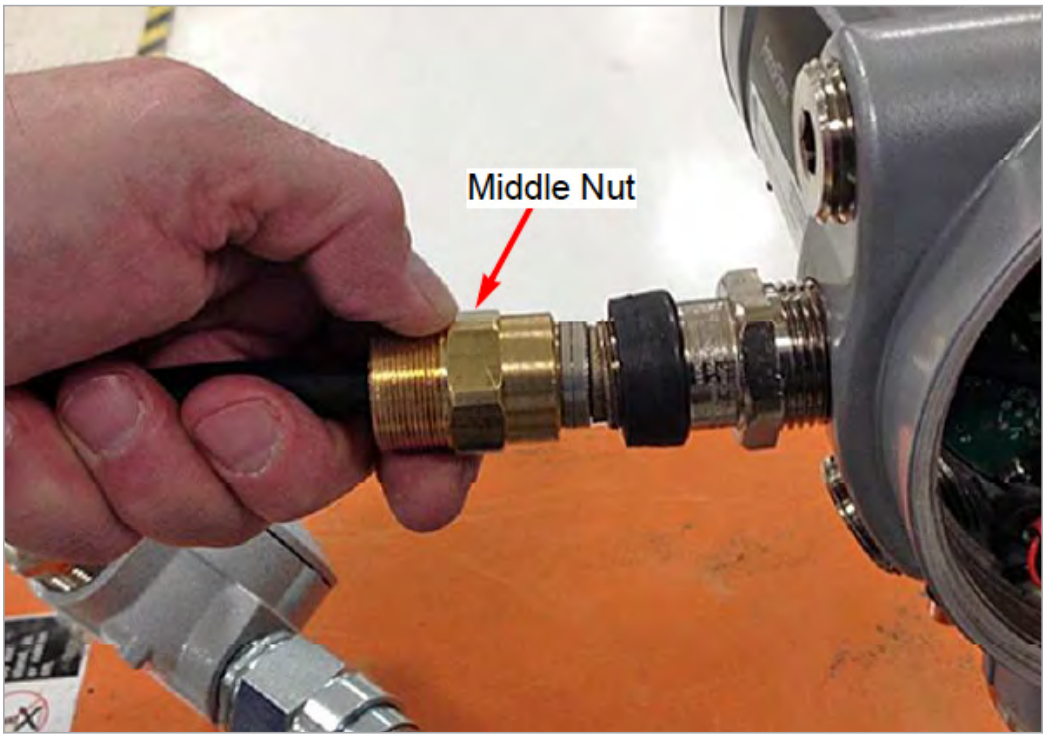

Figure 9: Installing the middle nut

5.0 Installing cable glands (cont.)

7. Tighten the *Middle Nut* completely by hand (see *Figure 10* below).

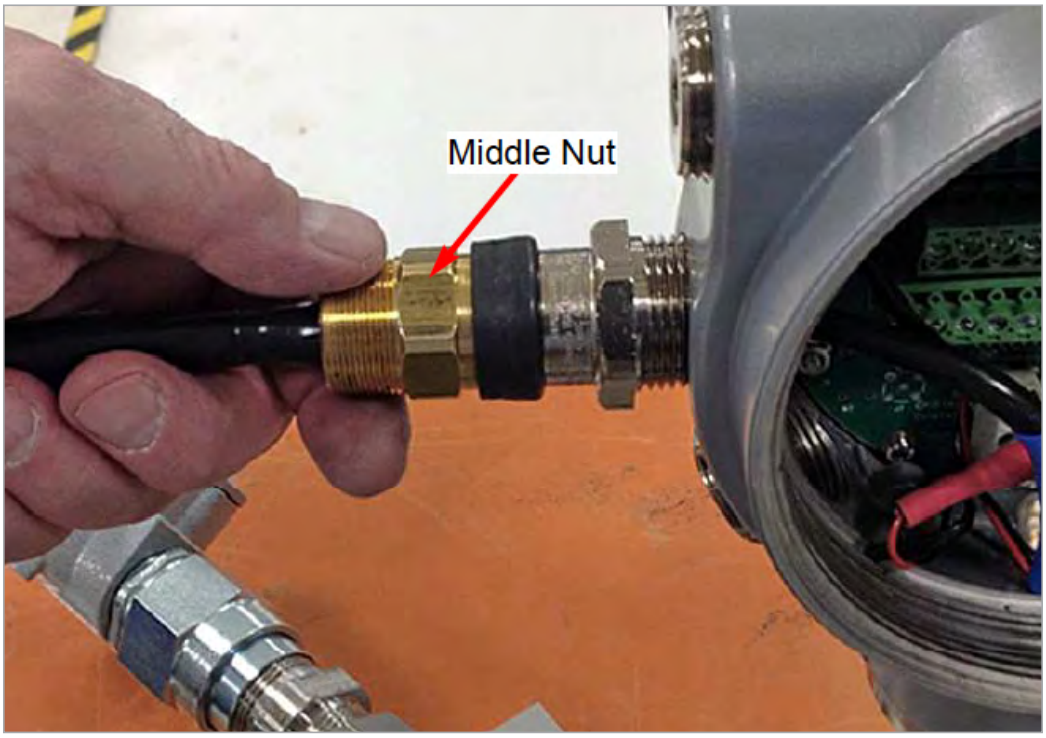

Figure 10: Tightening the middle nut by hand

8. Tighten the *Middle Nut* with a wrench, but be very careful not to overtighten the nut or the *Armor Wires* may be broken (see Figure 11 below).

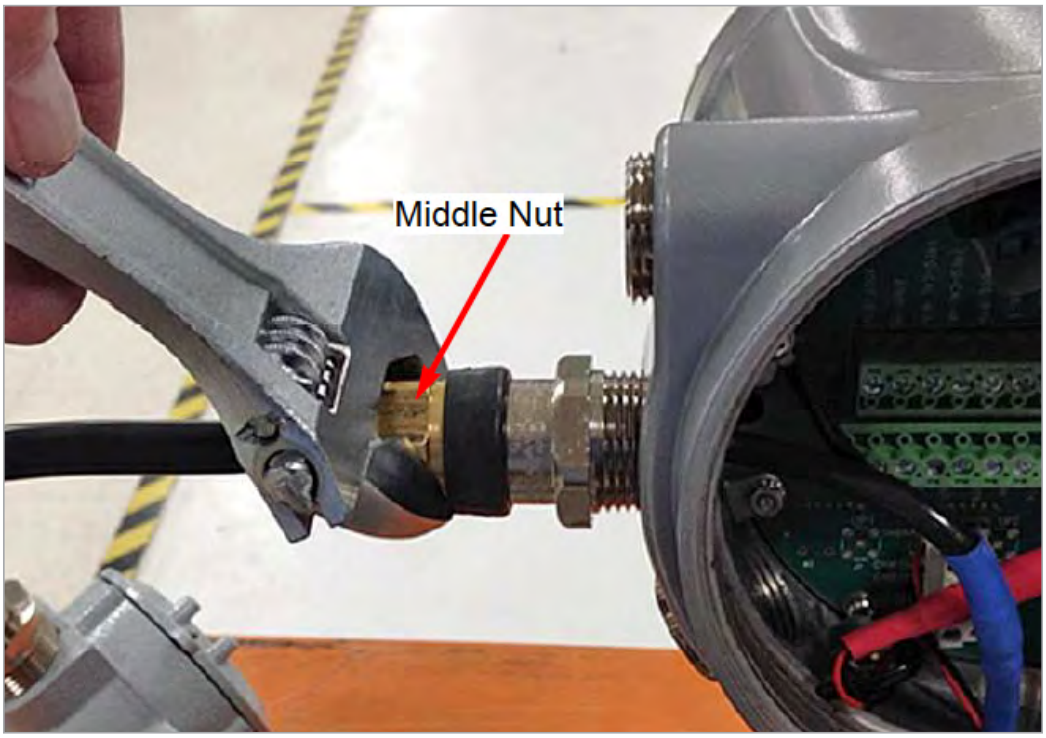

Figure 11: Tightening the middle nut with a wrench

5.0 Installing cable glands (cont.)

9. Screw the *Back Nut* over the Retaining Collar (see *Figure 12* below).

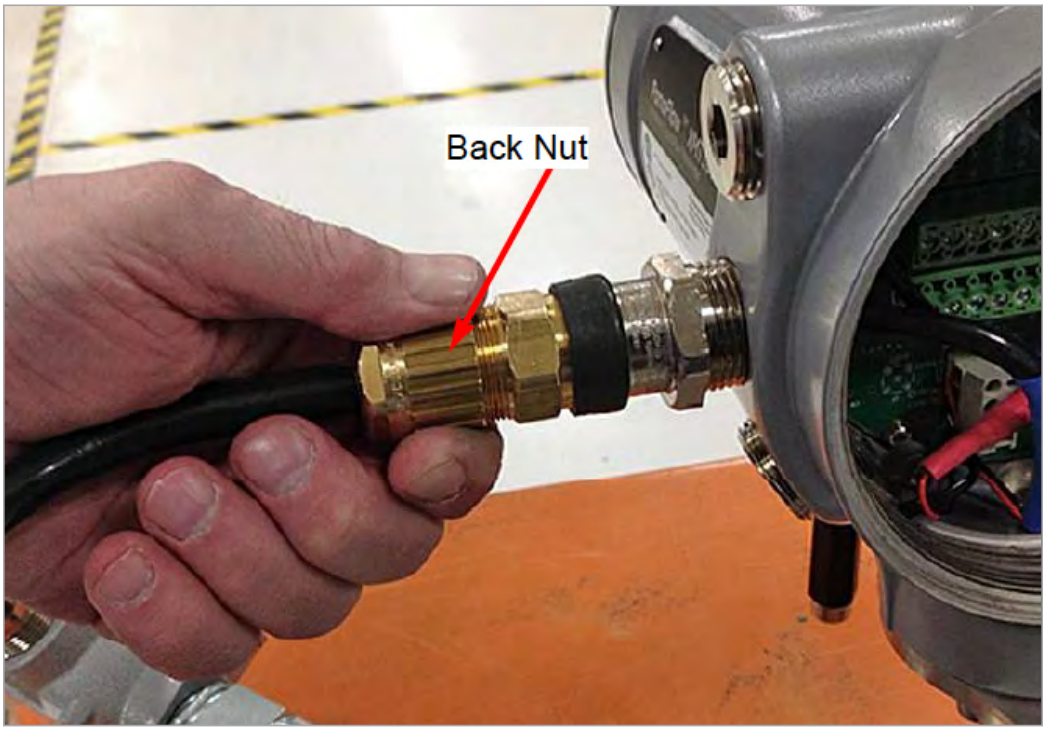

Figure 12: Screwing the back nut over the retaining collar

10. Hand tighten the *Back Nut* to secure the *Coaxial Cable* and make a weather-tight seal (see *Figure 13* below).

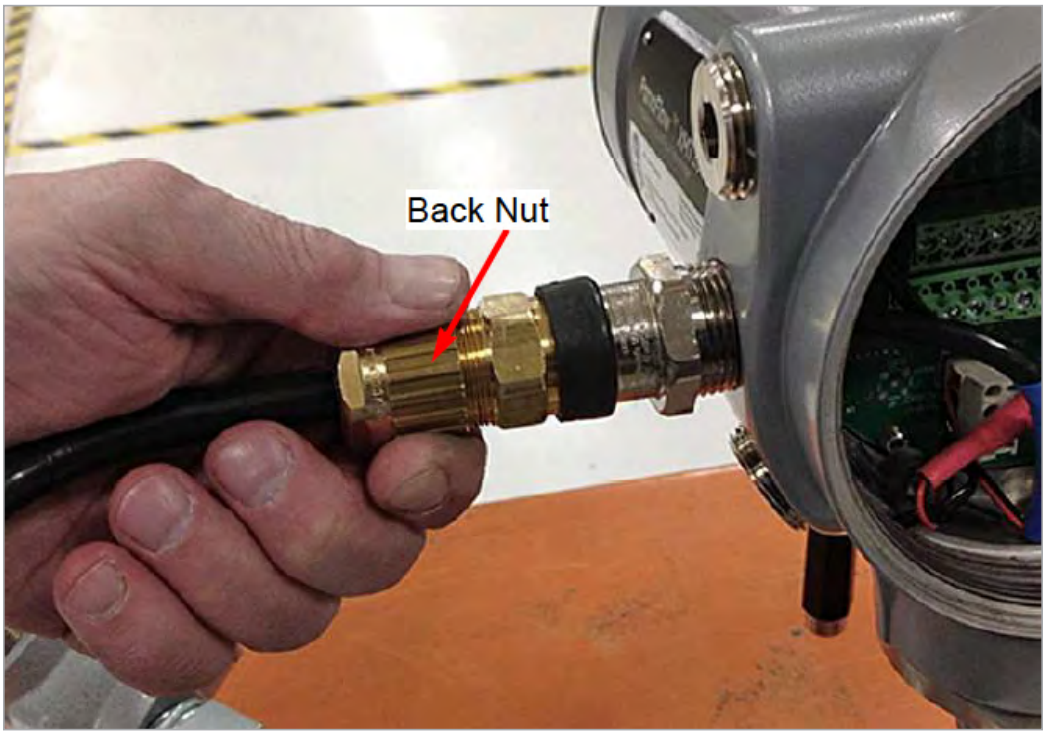

Figure 13: Tightening the back nut by hand

5.0 Installing cable glands (cont.)

11. Slide the *Rubber Boot* down the cable and over the *Cable Gland Assembly* (see *Figure 14* below).

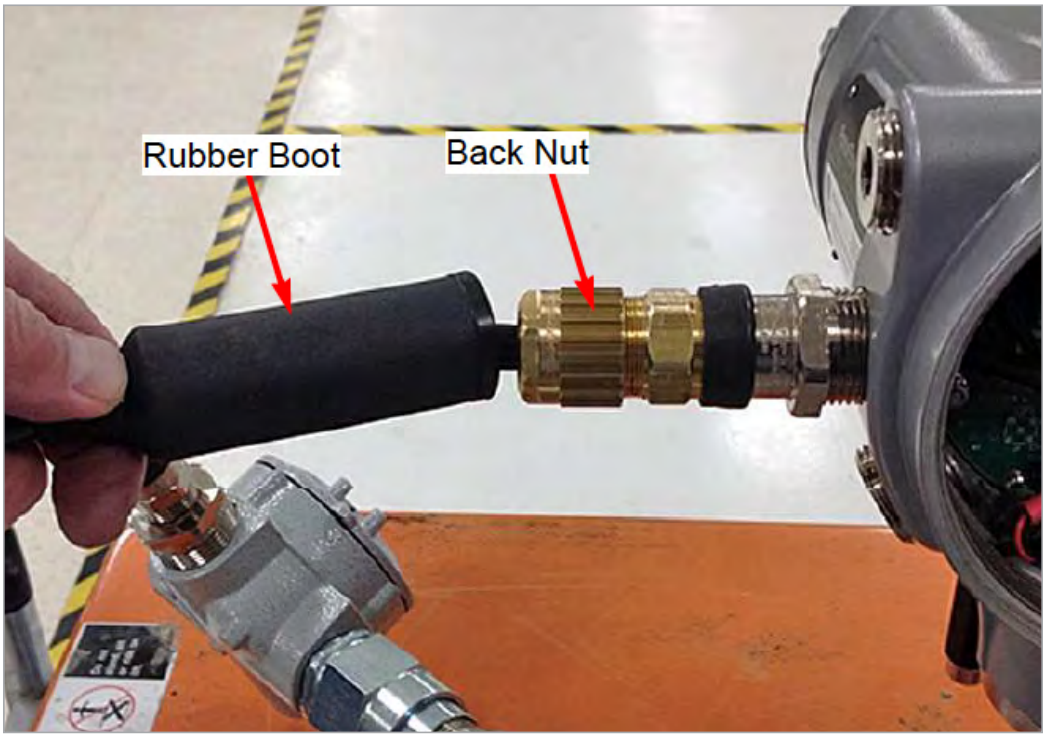

Figure 14: Sliding the rubber boot over the cable gland assembly

12. Make sure the *Rubber Boot* completely covers the *Cable Gland* and that no tears have occurred in the boot during the assembly process (see *Figure 15* below).

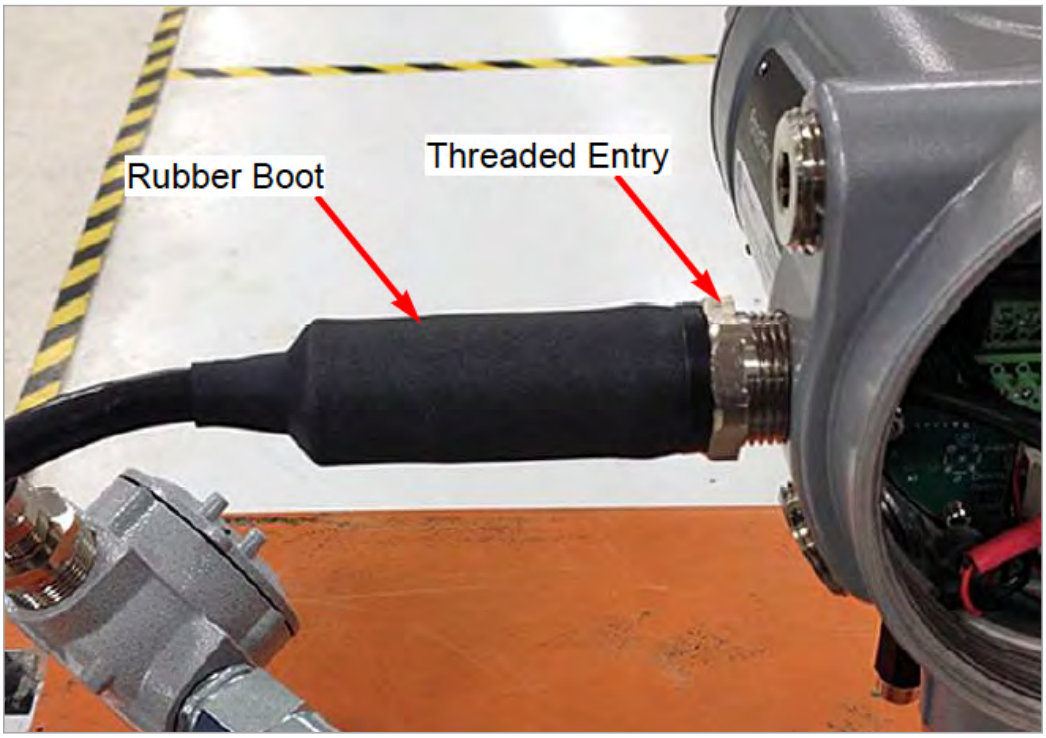

Figure 15: The Completed Cable Gland Assembly

5.0 Installing cable glands (cont.)

13. After the coaxial cables have been properly installed in their cable glands, they must be connected to the terminal blocks inside the flow transmitter enclosure (see Figure 16 below) as follows:

Attention!

Because the PanaFlow LZ system has the flexibility to use several different Panametrics flow transmitters, the photographs used in this manual may appear slightly different from your system. However, the basic instructions are valid for all PanaFlow LZ systems.

a. Connect the transducer wires to their terminal block per the instructions in the for your flow transmitter.

b. Make sure all of the transducer wires are properly dressed and that they are neatly arranged inside the flow transmitter enclosure.

c. Use the flexible strain reliefs inside the flow transmitter enclosure to keep all of the transducer wires clear of the threaded areas.

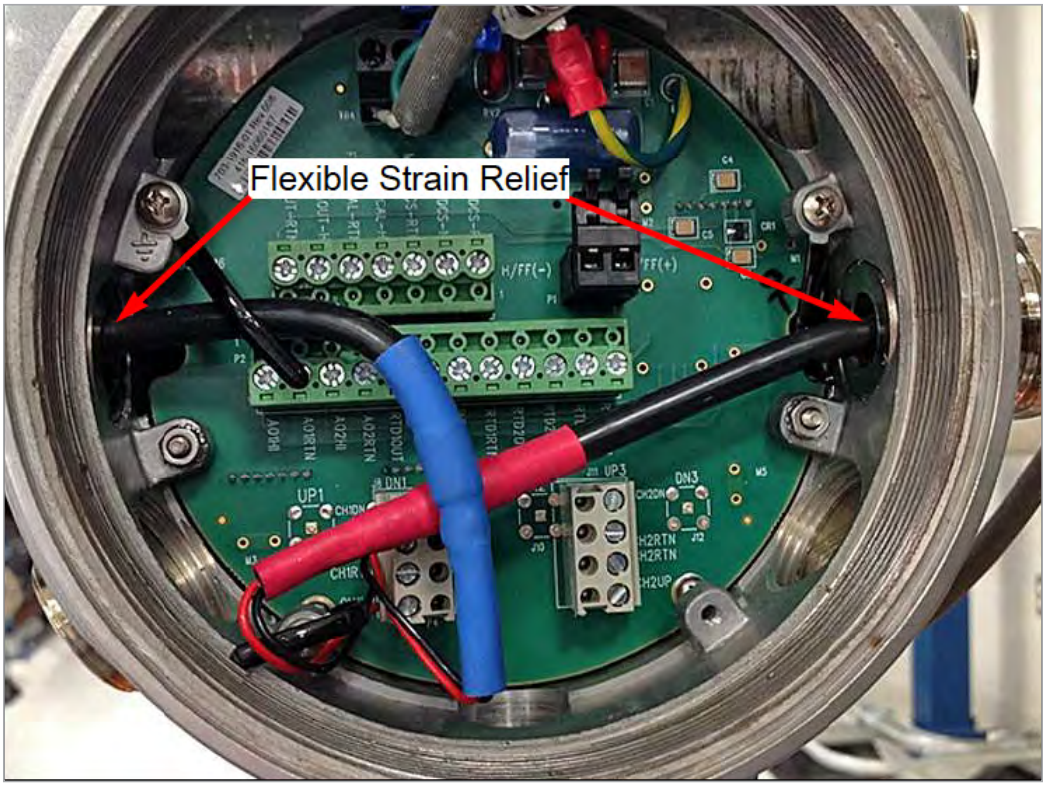

Figure 16: Terminating the transducer cables

6.0 Specifications

6.1 Operation and performance

Fluid types

Liquids: acoustically conductive fluids, including most clean liquids, and many liquids with small amounts of entrained solids or gas bubbles

Flow measurement

Correlation Transit Time model

Paths

1-Path: 2 in. to 24 in. (50 mm to 600 mm) pipe
2-Path: 3 in. to 24 in. (80 mm to 600 mm) pipe

Pipe sizes

2 to 24 in. (50 to 600 mm)

Pipe material

Carbon steel
Stainless steel (316/316L)

Accuracy

±0.5% of reading for velocity above 2 ft/s (0.6 m/s) up to 40 ft/s (12.2 m/s) with a resolution of ± 2 mm/s

Accuracy statement assumes measurement of a single phase homogeneous liquid with a fully developed symmetrical flow profile passing through the meter. Applications with piping arrangements that create an asymmetrical flow profile may require extended piping straight runs and/or flow conditioning for the meter to perform to this specification.

Repeatability

±0.3% of reading typical

Range (bidirectional)

±0.1 to 40 ft/s (0.03 to 12.19 m/s)

Measurement parameters

Dependent upon flow transmitter used. Please refer to individual flow transmitter product data sheet.

6.2 Electronics/flow transmitter

Temperature range

Operating: -40 to 140°F (-40 to +60°C)
Storage: -67 to 167°F (-55 to 75°C)

6.3 Meter body and transducer

Pressure rating

Up to maximum allowable flange operating pressure at temperature, per ASME B16.5

Temperature range

WT Transducers:- 40 to 175°C (-40 to 347°F)
BWT Transducers: -40 to 100°C (-40 to 212°F)
-40 to 250°C (-40 to 482°F)

Temperature rating of -20°C if used with carbon steel meter body

Transducer material

316L Stainless steel (buffers)

Meter Body materials

Carbon steel
Stainless steel (316/316L)

Certification

Electronics/Transducers: Explosion-proof Class I, Division 1, Groups B,C&D
ATEX Flameproof II 2 G Ex d IIC T6
IECEx Flameproof II 2 G Ex d IIC T6 (BWT only)

Flow Cell: NACE MR0175 and MR0103, PED 2014/68/EU

Dimensions

Refer to drawings 712-2122 to 712-2125

Drawing	Description
712-2122	General arrangement drawing, PanaFlow LZ, 6" and 3", 1 path, 2 traverse, tilted diameter
712-2123	General arrangement drawing, PanaFlow LZ, 4" to 24", 1 path, 1 traverse, tilted diameter
712-2124	General arrangement drawing, PanaFlow LZ, 3" and 4", 2 path, 1 traverse, tilted diameter
712-2125	General arrangement drawing, PanaFlow LZ, 6" to 24", 2 path, 1 traverse, mid-radius

6.3 Transducer cables

Integral Cables

- Mineral insulated cables with potted cable glands (for North America & Canada hazardous locations)
- Armored flame retardant coaxial cables with ATEX/IECEx certified cable glands (for European hazardous locations)

Remote Cables

ATEX/IECEx: Armored RG-62 for ATEX/IECEx
US/CAN: Non-armored RG-62, conduit not included

Remote cables are not included and must be ordered separately. Maximum cable length is 1000 ft (300 m).

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Experts in flare management, Panametrics technology also reduces flare emissions and optimizes performance.

With a reach that extends across the globe, Panametrics' critical measurement solutions and flare emissions management are enabling customers to drive efficiency and achieve carbon reduction targets across critical industries including: Oil & Gas; Energy; Healthcare; Water and Wastewater; Chemical Processing; Food & Beverage and many others.

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