# PD663 Explosion-Proof Loop-Powered Meter

Data Sheet


ProtEX™ Lite

IECEx CE

- Fully-Approved Explosion-Proof Loop-Powered Meters
- 4-20 mA Input with ±0.05% Accuracy of Calibrated Span
- 1.7 Volt Drop (4.7 Volt Drop with Backlight)
- Easy Field Scaling in Engineering Units without a Calibrator
- 0.6" (15.2 mm) 3½+ Digits LCD Display; -1999 to 2999
- Display Mountable at 0°, 90°, 180°, & 270°
- HART® Protocol Transparent
- Loop-Powered Backlight
- Operating Temperature Range: -40 to 75°C (-40 to 167°F)
- Installation Temperature Range: -55 to 75°C (-67 to 167°F)
- Four Internal Buttons for Easy Field Scaling
- Max/Min Display
- Programmable Noise Filter
- 32-Point Linearization & Square Root Extraction
- Conformal Coated PCBs for Dust & Humidity Protection
- CSA Certified for Explosion-Proof / Dust-Ignition Proof / Flame-Proof
- ATEX and IECEx Certified as Explosion-Proof
- Built-In Flange for Wall or Pipe Mounting
- Explosion-Proof, IP68, NEMA 4X Die-Cast Aluminum & Stainless Steel Enclosures
- Two 1/2" NPT or M20 Conduit Openings
- 1.5" U-Bolt Kit & 2" Pipe Mounting Kit Available
- Stainless Steel Tag Available
- 3-Year Warranty



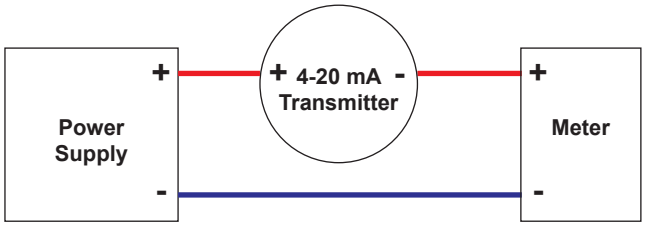
PRECISION DIGITAL

## WHY USE LOOP-POWERED METERS?

The most basic decision a user wishing to display a 4-20 mA signal on a digital display has to make is: should the meter be powered by line voltage or should it be powered by the 4-20 mA loop? The meters in this data sheet are powered by the 4-20 mA loop. The three main benefits of this are:

- No additional power required
- Easy wiring
- Additional digital displays can easily be added in the same loop

The diagram on the right illustrates how a loop-powered meter is wired. Notice there are only two connections made to the meter.




For more information on loop-powered meters, check out these white papers:

Fundamentals of Loop-Powered Devices

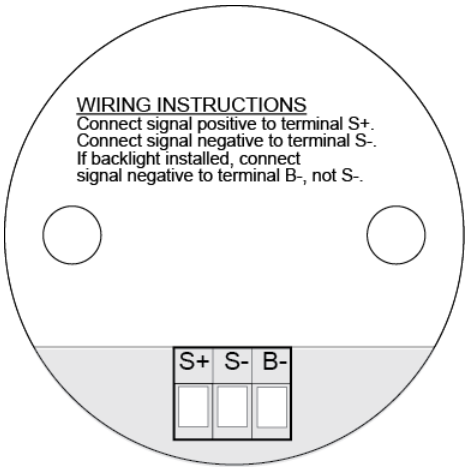
Loop-Powered vs Line-Powered Meters

## OVERVIEW

**Front**


**PD663-0K0-00**
**Aluminum Loop-Powered Meter**

**Connections**




### Hazardous Area Aluminum & Stainless Steel Loop-Powered Meter

The PD663 is a loop-powered field meter that is CSA Certified as Explosion-Proof, Dust-Ignition-Proof, and Flame-Proof, and ATEX & IECEx Certified as Explosion-Proof. It is available in either an aluminum or stainless steel enclosure. The PD663 is easy to install and program and it can be seen in a variety of lighting conditions, even in bright sunlight. It will operate down to -40°C and is approved for installation in areas where the temperature gets as cold as -55°C, however, the display will cease functioning.

The fact that this meter is loop-powered means that there is no need to run additional, costly power lines into a hazardous area. The meter gets all the power it needs from the 4-20 mA loop and its 1.7 V drop results in a minimal burden on the loop. Loop-powered backlighting is a standard feature that allows the meter to be read in dimly lit areas.

The meter features a wide -40 to 75°C operating temperature range and is available with two 1/2" NPT or M20 threaded conduit openings and a built-in flange for wall or pipe mounting. Calibration is a quick process involving the four internal pushbuttons. The 3½+ digits display on the ProtEX-Lite will read up to 2999.

# PHYSICAL FEATURES

## ProtEX-Lite Enclosures


The ProtEX-Lite PD663-0K0-00 comes with two 1/2" NPT conduit openings and the PD663-0K0-00-M20 comes with two M20 conduit openings.

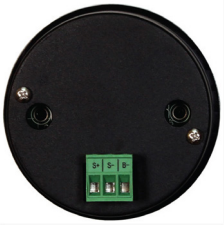
## Great for Cold Temperatures

The ProtEX-Lite PD663 will operate over a temperature range of -40 to 75°C (-40 to 167°F). Below -40°C, the display will cease functioning, however, the instrument is approved to be installed in locations where the temperature goes down to -55°C.

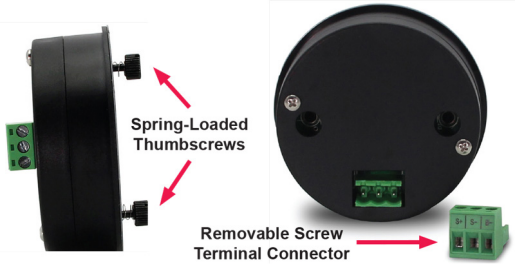
## Electronics Module

The PD663 electronics module is housed in a plastic enclosure that provides a degree of environmental protection for the electronics circuitry. The module is mounted to the enclosure with spring-loaded thumbscrews and can be oriented in 0°, 90°, 180°, or 270° increments. Connections are made to a removable screw terminal block.


PD663 Electronics Module



Back Cover & Connector



## Easy Pipe Mounting

The ProtEX-Lite comes with a built-in mounting flange. This allows for easy mounting to walls or pipes using the PDA6631-SS Stainless Steel U-Bolt Kit for a 1.5” pipe or the PDA6863-SS Stainless Steel Pipe Mounting Kit for a 2” pipe. A slot on the back of the enclosure makes it easy to center the unit on a pipe.

**PDA6631-SS 1.5" U-Bolt Kit**

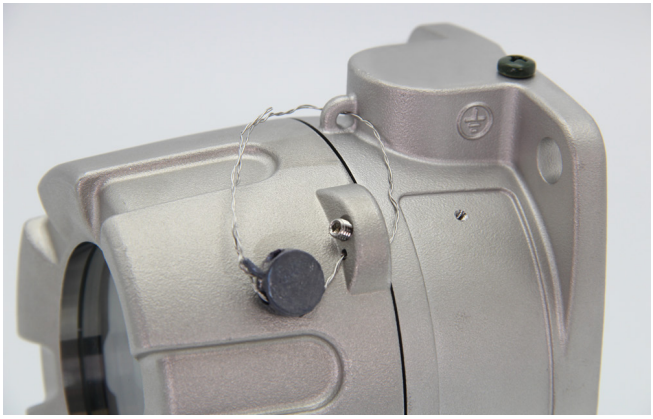
**PDA6863-SS 2" Pipe Mounting Kit**

## Rotatable Display Module

The display module can be rotated in 90° increments providing added mounting flexibility. Plus the various conduit connections allow a variety of installation options.

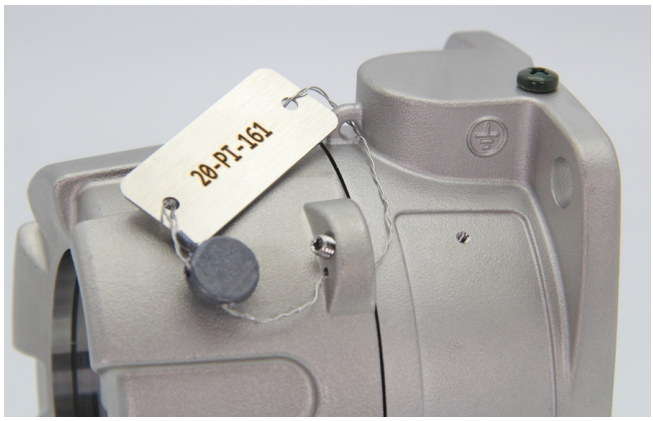
## Tamper-Proof Capability

The instrument can be made tamper-proof by inserting a wire through the built-in loop on the base of the enclosure and a hole in the lid of the enclosure and securing this wire with a lead seal.



## Stainless Steel Tag Attaching Loop

The enclosure is equipped with a loop at the top to easily attach a PDA-SSTAG stainless steel tag.




## PROGRAMMING

The PD663 comes calibrated and scaled at the factory to display a 4.00 to 20.00 mA signal on startup. To change the scaling, follow along using the 4 button interface.

# ACCESSORIES

## PDA6631-SS 1.5" U-Bolt Kit

The PDA6631-SS stainless steel U-Bolt Kit provides a convenient way to mount the meter to a 1.5" pipe.

| Model | Description |
|---|---|
| PDA6631-SS | Stainless Steel 1.5" U-Bolt Kit.<br>All Material: Stainless Steel; (1) U-Bolt for 1.5" Pipe with (2 each) Washers, Lock Washers, and Nuts. |

## PDA6863-SS 2" Pipe Mounting Kit

The PDA6863-SS Pipe Mounting Kit provides a convenient way to mount the PD663-SS to a 2" pipe.

| Model | Description |
|---|---|
| PDA6863-SS | Stainless Steel 2" Pipe Mounting Kit.<br>All Material: Stainless Steel; (1) Plate with (2 each) Bolts, Washers, Lock Washers & Nuts to Mount Meter. (1) U-Bolt for 2" Pipe with (2 each) Washers, Lock Washers & Nuts. |

## PDA-SSTAG Stainless Steel Tag


The PDA-SSTAG is a laser etched stainless steel tag that can be customized with three lines of text. Each tag comes with a stainless steel wire and lead seal for easy mounting wherever you need.

| Model | Description |
|---|---|
| PDA-SSTAG | Stainless Steel Tag |

# ACCESSORIES CONTINUED

## 24 VDC Transmitter Power Supply


The PDA1024-01 24 VDC power supply can be used for a variety of functions like powering 4-20 mA transmitters. It can be mounted on a PDA1002 DIN rail.

| Model | Description |
|---|---|
| PDA1024-01 | 24 VDC Transmitter Power Supply |
| PDA1002 | 6" DIN Rail Mounting Kit |

### Specifications

| | |
|---|---|
| **Input Voltage** | 85-264 VAC; 120-370 VDC |
| **Output Voltage** | 21.6-29 VDC; 1.5 A rated current. |
| **Input Frequency** | 47-63 Hz |
| **AC Current** | 115 VAC: 0.88 A; 230 VAC: 0.48 A |
| **Connections** | Screw terminals |
| **Overload Protection** | 105-160% rated output power. Constant current limiting, recovers automatically after fault condition is removed |
| **Operating Temperature** | -30 to 60°C (-22 to 140°F) |
| **Vibration** | 10-500 Hz, 2G 10 min./1 cycle, period for 60 min. each along X, Y, Z axes |
| **Safety Standards** | UL 508 Listed and UL Recognized Component |
| **Dimensions** | 1.40" x 3.50" x 2.10"<br>(35 mm x 90 mm x 54.5 mm)<br>(W x H x D) |
| **Warranty** | 1 year parts & labor |

**⚠ WARNING**

- PDA1024-01 does not carry hazardous area approvals and is thus not suitable for location in hazardous areas. The use of additional protective devices may allow it to be installed in a safe area and connected to a device in a hazardous area. User should consult a professional engineer to determine suitability of these products for their specific application.

# USEFUL TOOLS

## PD9501 Multi-Function Calibrator


This PD9501 Multi-Function Calibrator has a variety of signal measurement and output functions, including voltage, current, thermocouple, and RTD.

| Model | Description |
|---|---|
| PD9501 | Multi-Function Calibrator |

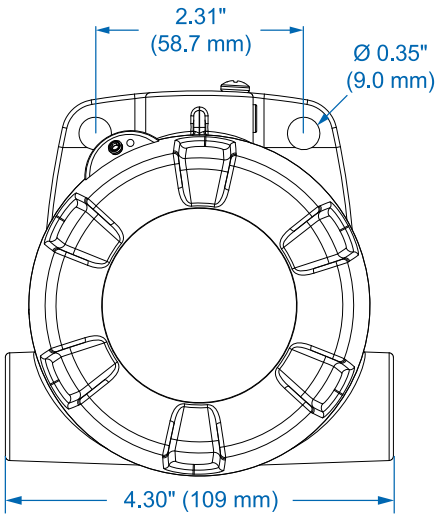
## PD9502 Low-Cost Signal Generator


The PD9502 is a low-cost, compact, simple to use 4-20 mA or 0-10 VDC signal generator. It can easily be set for 0-20 mA, 4-20 mA, 0-10 V or 2-10 V ranges. Signal adjustment is made with a one-turn knob. A 15-27 VDC wall plug is provided with the instrument. Optional USB power bank is available.

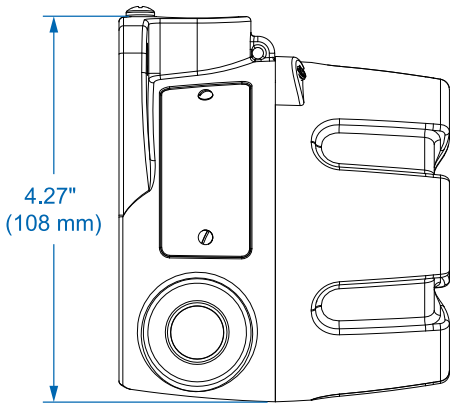
| Model | Description |
|---|---|
| PD9502 | Low-Cost Signal Generator |
| PDA1001 | USB Power Bank |

## DIMENSIONS

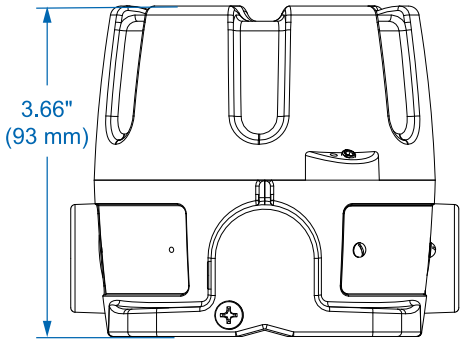
**Units: Inches (mm)**




**Front View**




**Side View**

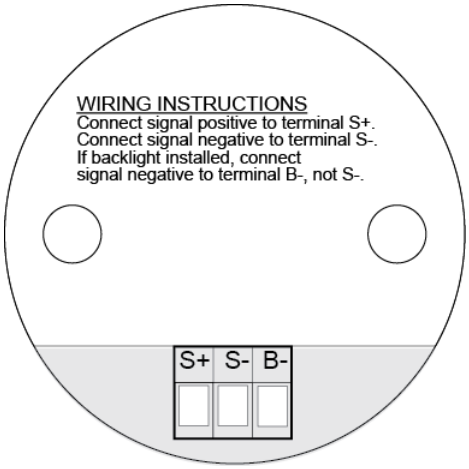



**Top View**



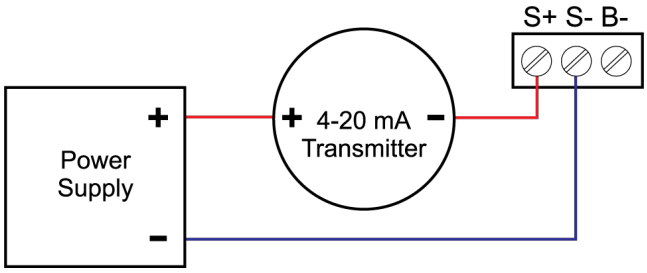
## CONNECTIONS

### Connectors Labeling

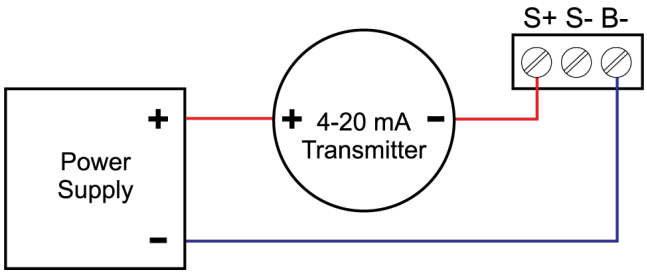



## WIRING DIAGRAMS

For existing applications, one of the great benefits of loop-powered meters is that they get their power directly from the 4-20 mA loop and thus require no additional wiring. All a user has to do is break the existing loop and wire in the meter.




**4-20 mA Input Connection without Backlight**




**4-20 mA Input Connection with Backlight**

# SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

## General

| | |
|---|---|
| **Display** | 0.6" (15.2 mm) LCD, 3½+ digits; -1999 to 2999 |
| **Loop-Powered Backlight** | Powered directly from the 4-20 mA loop, no batteries required. Backlight can be enabled or disabled via alternative wiring of terminal block. The display brightness will increase as the input signal current increases. |
| **Display Update Rate** | 2 Updates/Second |
| **Display Orientation** | Display may be mounted at 90° increments up to 270° from default orientation. |
| **Overrange** | Display flashes 2999 |
| **Underrange** | Display flashes -1999 |
| **Programming Method** | 4 Internal pushbuttons (behind glass) |
| **Noise Filter** | Programmable HI, LO, or OFF |
| **Recalibration** | Recalibration is recommended at least every 12 months. |
| **Max/Min Display** | Max/Min readings reached by the process are stored until reset by the user or until power to the meter is turned off. |
| **Non-Volatile Memory** | All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost. |
| **Normal Mode Rejection** | 64 dB at 50/60 Hz |
| **Environmental** | Operating temperature range: -40 to 75°C<br>Storage temperature range: -55 to 75°C<br>Installation temperature range: -55 to 75°C<br>Relative humidity: 0 to 90% non-condensing<br>Printed circuit boards are conformally coated. |
| **Connections** | Screw terminals accept 12 to 22 AWG wire |
| **Mounting** | May be mounted directly to conduit.<br>Two mounting holes for 1.5" pipe or wall mounting. See Dimensions on page 7. |
| **Tightening Torque** | Screw terminal electrical connectors: 4.5 lb-in (0.5 Nm) |
| **Overall Dimensions** | 4.30" x 4.27" x 3.66"<br>(109 mm x 108 mm x 93 mm)<br>(W x H x D) |
| **Weight** | AL: 2.45 lbs (40 oz, 1.13 kg)<br>SS: 5.00 lbs (80 oz, 2.3 kg) |
| **Warranty** | 3 years parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details. |

## Input

| | |
|---|---|
| **Input** | 4-20 mA |
| **Accuracy** | ±0.05% of calibrated span ±1 count |
| **Function** | Linear (2 to 32 points) or square root |
| **Temperature Drift** | 50 PPM/°C from -40 to 75°C ambient |
| **Decimal Point** | User selectable decimal point |
| **Minimum Span** | Input 1 & Input 2: 0.40 mA |
| **Calibration Range** | An Error message will appear if input 1 and input 2 signals are too close together. |

| **Input Range** | **Minimum Span Input 1 & Input 2** |
|---|---|
| 4-20 mA | 0.40 mA |

| **Maximum Voltage Drop & Equivalent Resistance** | **Without Backlight** | **With Loop Powered Backlight** |
|---|---|---|
| | 1.7 VDC @ 20 mA | 4.7 VDC @ 20 mA |
| | 85 Ω @ 20 mA | 235 Ω @ 20 mA |

| | |
|---|---|
| **Input Overload** | Over current protection to 2 A max |
| **HART Transparency** | The meter does not interfere with existing HART communications; it displays the 4-20 mA primary variable and it allows the HART communications to pass through without interruption. The meter is not affected if a HART communicator is connected to the loop. The meter does not display secondary HART variables. |

## Enclosure

| | |
|---|---|
| **Material** | AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated<br>SS Models: ASTM A743 CF8M investment-cast 316 stainless steel |
| **Gasket (O-Ring)** | Fluoroelastomer |
| **Rating** | NEMA 4X, IP68 Explosion-proof |
| **Color** | AL: Blue; SS: Silver |
| **Window** | Borosilicate glass |
| **Conduits** | PD663-0K0-00: Two 1/2" NPT<br>PD663-0K0-00-M20: Two M20<br>PD663-0K0-SS: Two 1/2" NPT<br>PD663-0K0-SS-M20: Two M20 |
| **Flange** | Built-in flange for wall and pipe mounting |
| **Tamper-Proof Seal** | Cover may be secured with tamper-proof seal |
| **ATEX & IECEx** | Flame-proof protection<br>Ⓔx II 2 G D<br>Ex db IIC Gb<br>Ex tb IIIC Db<br>IP66/IP68<br>Tamb: -55°C to +85°C<br>Certificate Number: Sira 19ATEX1252U<br>Certificate Number: IECEx SIR 19.0075U |
| **CSA** | Class I, Division 1, Groups A, B, C, D<br>Class II, Division 1, Group E, F, G<br>Class III<br>Ex db IIC Gb; Ex tb IIIC Db<br>Class I, Zone 1, AEx db IIC Gb<br>Zone 21, AEx tb IIIC Db<br>IP66/IP68/TYPE 4X<br>Tamb: -55°C to +85°C<br>Certificate Number: CSA 19.80011200U |
| **UL** | Class I, Division 1, Groups A, B, C, D<br>Class II, Division 1, Groups E, F, G<br>Class III<br>Class I, Zone 1, AEx db IIC Gb<br>Zone 21, AEx tb IIIC<br>Ex db IIC Gb; Ex tb IIIC Db<br>IP66/IP68/TYPE 4X<br>Tamb: -55°C to +85°C<br>Certificate Number: E518920 |

**Note:** The above approvals are for the enclosure only. See next page for approval on the entire instrument.

## General Compliance Information

### Electromagnetic Compatibility

| | |
|---|---|
| **EMC Emissions** | • CFR 47 FCC Part 15 Subpart B Class A emissions requirements (USA)<br>• ICES-003 Information Technology emissions requirements (Canada)<br>• AS/NZS CISPR 11 Group 1 Class A ISM emissions requirements (Australia/New Zealand)<br>• EN 55011 Group 1 Class A ISM emissions requirements (EU)<br>• EN 61000-6-4 Emissions requirements for Heavy Industrial Environments - Generic |
| **EMC Emissions and Immunity** | EN 61326-1 EMC requirements for Electrical equipment for measurement, control, and laboratory use – industrial use |

### Product Ratings and Approvals

| | |
|---|---|
| **CSA** | Explosion-proof for use in:<br>Class I, Division 1, Groups B, C, D<br>Class II, Division 1, Groups E, F, G<br>Class III, Division 1, T6<br>Ex d IIC T6<br>Ta = -55°C to +75°C<br>Enclosure: Type 4X & IP66/68<br>Certificate Number: CSA 11 2325749 |
| **ATEX** | Explosion-proof for use in:<br>⟨Ex⟩ II 2 G D<br>Ex db IIC T6 Gb<br>Ex tb IIIC T85°C Db IP68<br>Ta = -55 to 75°C<br>Certificate Number: Sira 10ATEX1116X |
| **IECEx** | Explosion-proof for use in:<br>Ex db IIC T6 Gb<br>Ex tb IIIC T85°C Db IP68<br>Ta = -55 to 75°C<br>Certificate Number: IECEx SIR 10.0056X |

## ORDERING INFORMATION

| PD663 Explosion-Proof Meter Aluminum Enclosure | |
|---|---|
| **Model** | **Description** |
| PD663-0K0-00 | Explosion-Proof Aluminum Loop-Powered Process Meter with Backlight and Two 1/2" Conduit |
| PD663-0K0-00-M20 | Explosion-Proof Aluminum Loop-Powered Process Meter with Backlight and Two M20 Conduit Openings |

| PD663-SS Explosion-Proof Meter Stainless Steel Enclosure | |
|---|---|
| **Model** | **Description** |
| PD663-0K0-SS | Explosion-Proof Stainless Steel Loop-Powered Process Meter with Backlight and Two 1/2" Conduit |
| PD663-0K0-SS-M20 | Explosion-Proof Stainless Steel Loop-Powered Process Meter with Backlight and Two M20 Conduit Openings |

## Accessories

| Model | Description |
|---|---|
| PDAPLUG50 | 1/2" NPT 316 Stainless Steel Conduit Plug with Approvals |
| PDAPLUGM20 | M20 316 Stainless Steel Conduit Plug with Approvals |
| PDAADAPTER-50M-75F | M-1/2" NPT to F-3/4" NPT Adapter with Approvals |
| PDAADAPTER-50M-M20F | M-1/2" NPT to F-M20 Adapter with Approvals |
| PD9501 | Multi-Function Calibrator |
| PD9502 | Low-Cost Signal Generator |
| PDA1001 | USB Power Bank |
| PDA1002 | 6" DIN Rail Mounting Kit |
| PDA1024-01 | 24 VDC Power Supply for DIN Rail |
| PDA-SSTAG | Stainless Steel Tag |
| PDA6631-SS | Stainless Steel 1.5" U-Bolt Kit |
| PDA6863-SS | Stainless Steel 2" Pipe Mounting Kit |

**Note:** Unless otherwise specified, the above accessories do not carry hazardous area approvals and are thus not suitable for location in hazardous areas.

⚠ **WARNING**
Cancer and Reproductive Harm - **www.P65Warnings.ca.gov**

### Disclaimer

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