

# PD663 Explosion-Proof Loop-Powered Meter

## Data Sheet



**ProtEX™**  
Lite



IECEX



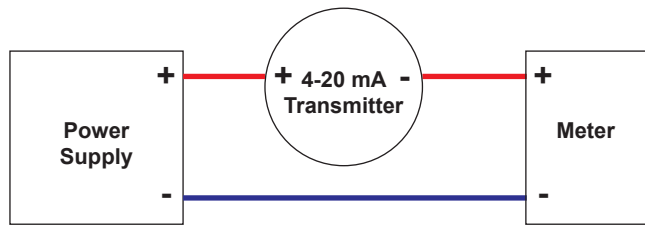
- Fully-Approved Explosion-Proof Loop-Powered Meters
- 4-20 mA Input with  $\pm 0.05\%$  Accuracy of Calibrated Span
- 1.7 Volt Drop (4.7 Volt Drop with Backlight)
- Easy Field Scaling in Engineering Units without a Calibrator
- 0.6" (15.2 mm)  $3\frac{1}{2}+$  Digits LCD Display; -1999 to 2999
- Display 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

## 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.

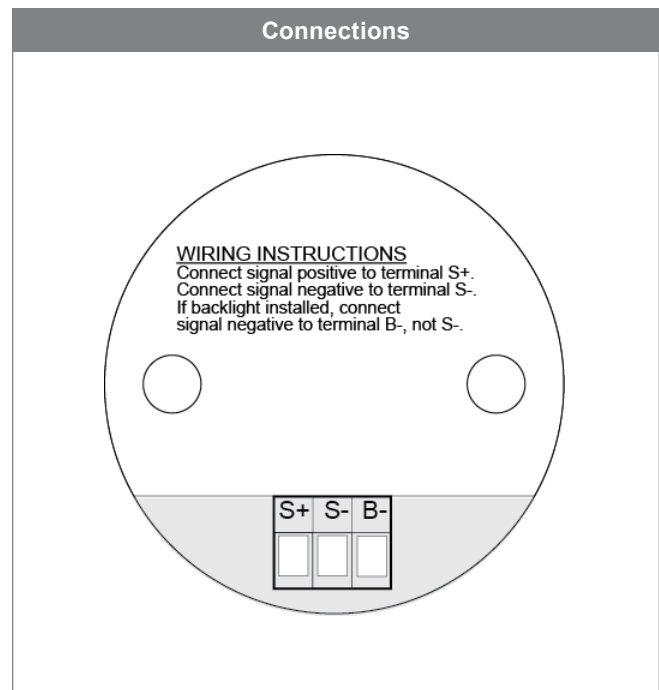


For more information on loop-powered meters, check out these white papers:

[Fundamentals of Loop-Powered Devices](#)

[Loop-Powered vs Line-Powered Meters](#)

## OVERVIEW



## 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 Flame-Proof and Protection by Enclosure. It is available in either 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 can be installed 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.



## 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

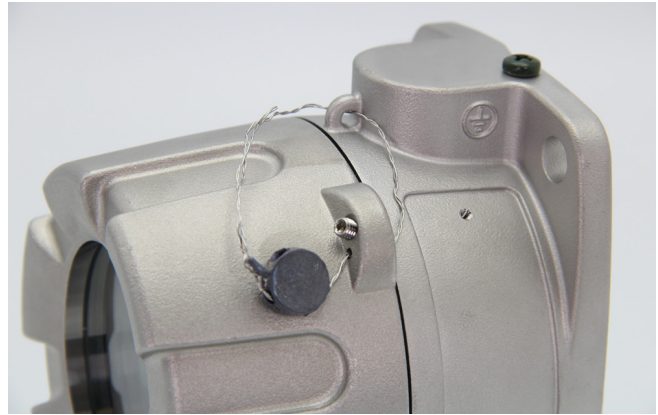
## Rotatable Display Module

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
<a href="#">PDA6631-SS</a>	Stainless Steel 1.5" U-Bolt Kit. All Material: Stainless Steel; (1) U-Bolt for 1.5" Pipe with (2 each) Washers, Lock Washers, and 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
<a href="#">PDA-SSTAG</a>	Stainless Steel Tag

**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
<a href="#">PDA6863-SS</a>	Stainless Steel 2" Pipe Mounting Kit. 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.

**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
<a href="#">PDA1024-01</a>	24 VDC Transmitter Power Supply
<a href="#">PDA1002</a>	6" DIN Rail Mounting Kit

**Specifications**

<b>Input Voltage</b>	85-264 VAC; 120-370 VDC
<b>Output Voltage</b>	21.6-29 VDC; 1.5 A rated current.
<b>Input Frequency</b>	47-63 Hz
<b>AC Current</b>	115 VAC: 0.88 A; 230 VAC: 0.48 A
<b>Connections</b>	Screw terminals
<b>Overload Protection</b>	105-160% rated output power. Constant current limiting, recovers automatically after fault condition is removed
<b>Operating Temperature</b>	-30 to 60°C (-22 to 140°F)
<b>Vibration</b>	10-500 Hz, 2G 10 min./1 cycle, period for 60 min. each along X, Y, Z axes
<b>Safety Standards</b>	UL 508 Listed and UL Recognized Component
<b>Dimensions</b>	1.40" x 3.50" x 2.10" (35 mm x 90 mm x 54.5 mm) (W x H x D)
<b>Warranty</b>	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
<a href="#">PD9501</a>	Multi-Function Calibrator

**PD9502 Low-Cost Signal Generator**

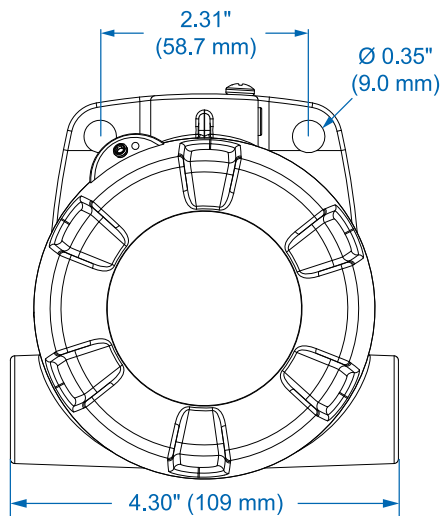


The PD9502 is a low-cost, compact, simple to use 4-20 mA or 0-10 VDC signal generator. It can easily be set for 0-20 mA, 4-20 mA, 0-10 V or 2-10 V ranges. Signal adjustment is made with a one-turn knob. A 15-27 VDC wall plug is provided with the instrument. Optional USB power bank is available.

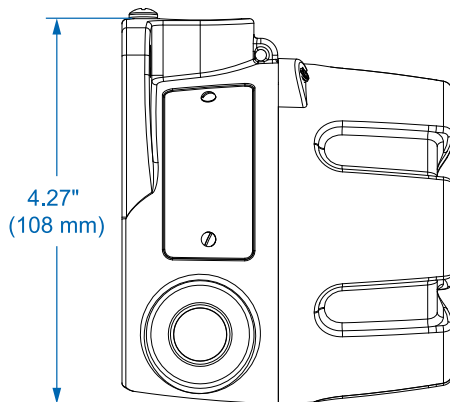
Model	Description
<a href="#">PD9502</a>	Low-Cost Signal Generator
<a href="#">PDA1001</a>	USB Power Bank

## DIMENSIONS

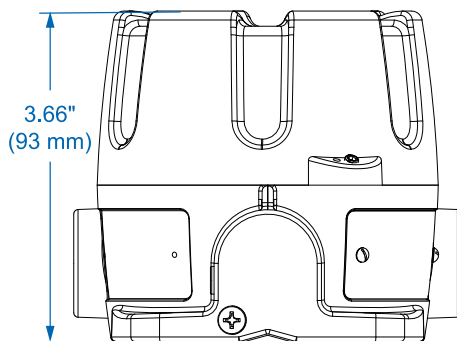
Units: Inches (mm)



Front View



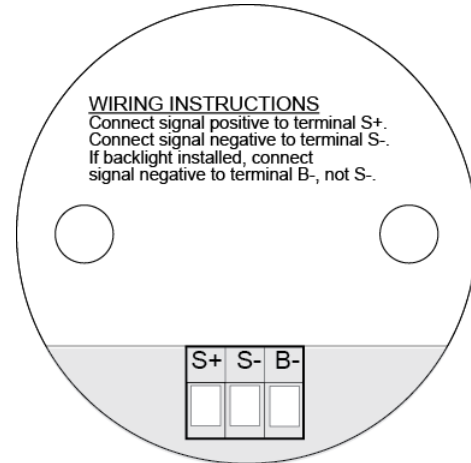
Side View



Top View

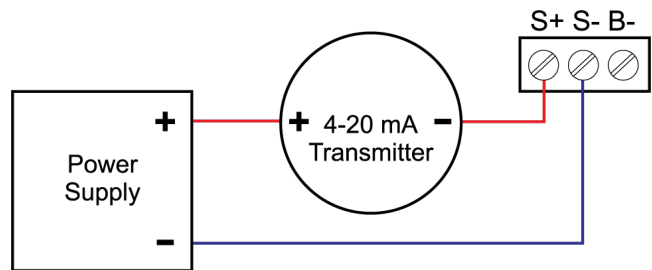
## CONNECTIONS

### Connectors Labeling

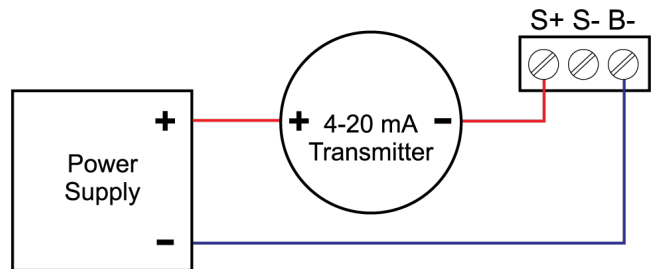


## WIRING DIAGRAMS

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



Download free 3-D CAD files of these instruments to simplify your drawings!

[predig.com/documentation-cad](http://predig.com/documentation-cad)

## SPECIFICATIONS

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

### General

<b>Display</b>	0.6" (15.2 mm) LCD, 3½+ digits; -1999 to 2999
<b>Loop-Powered Backlight</b>	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.
<b>Display Update Rate</b>	2 Updates/Second
<b>Display Orientation</b>	Display may be mounted at 90° increments up to 270° from default orientation.
<b>Overrange</b>	Display flashes 2999
<b>Underrange</b>	Display flashes -1999
<b>Programming Method</b>	4 Internal pushbuttons (behind glass)
<b>Noise Filter</b>	Programmable HI, LO, or OFF
<b>Recalibration</b>	Recalibration is recommended at least every 12 months.
<b>Max/Min Display</b>	Max/Min readings reached by the process are stored until reset by the user or until power to the meter is turned off.
<b>Non-Volatile Memory</b>	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
<b>Normal Mode Rejection</b>	64 dB at 50/60 Hz
<b>Environmental</b>	Operating temperature range: -40 to 75°C Storage temperature range: -40 to 75°C Installation temperature range: -55 to 75°C Relative humidity: 0 to 90% non-condensing Printed circuit boards are conformally coated.
<b>Connections</b>	Screw terminals accept 12 to 22 AWG wire
<b>Mounting</b>	May be mounted directly to conduit. Two mounting holes for 1.5" pipe or wall mounting. See Dimensions on page 7.
<b>Tightening Torque</b>	Screw terminal electrical connectors: 4.5 lb-in (0.5 Nm)
<b>Overall Dimensions</b>	4.30" x 4.27" x 3.66" (109 mm x 108 mm x 93 mm) (W x H x D)
<b>Weight</b>	AL: 2.45 lbs (40 oz, 1.13 kg) SS: 5.00 lbs (80 oz, 2.3 kg)
<b>Warranty</b>	3 years parts and labor. See Warranty Information and Terms & Conditions on <a href="http://www.predig.com">www.predig.com</a> for complete details.

### Input

<b>Input</b>	4-20 mA	
<b>Accuracy</b>	±0.05% of calibrated span ±1 count	
<b>Function</b>	Linear (2 to 32 points) or square root	
<b>Temperature Drift</b>	50 PPM/°C from -40 to 75°C ambient	
<b>Decimal Point</b>	User selectable decimal point	
<b>Minimum Span</b>	Input 1 & Input 2: 0.40 mA	
<b>Calibration Range</b>	An Error message will appear if input 1 and input 2 signals are too close together.	
	<b>Input Range</b>	<b>Minimum Span Input 1 &amp; Input 2</b>
	4-20 mA	0.40 mA
<b>Maximum Voltage Drop &amp; Equivalent Resistance</b>	<b>Without Backlight</b>	<b>With Loop Powered Backlight</b>
	1.7 VDC @ 20 mA	4.7 VDC @ 20 mA
	85 Ω @ 20 mA	235 Ω @ 20 mA
<b>Input Overload</b>	Over current protection to 2 A max	
<b>HART Transparency</b>	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

<b>Material</b>	AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated SS Models: ASTM A743 CF8M investment-cast 316 stainless steel
<b>Gasket (O-Ring)</b>	Fluoroelastomer
<b>Rating</b>	NEMA 4X, IP68 Explosion-proof
<b>Color</b>	AL: Blue; SS: Silver
<b>Window</b>	Borosilicate glass
<b>Conduits</b>	PD663-0K0-00: Two 1/2" NPT PD663-0K0-00-M20: Two M20
<b>Flange</b>	Built-in flange for wall and pipe mounting
<b>Tamper-Proof Seal</b>	Cover may be secured with tamper-proof seal
<b>ATEX &amp; IECEx</b>	Flameproof protection ⊕ II 2 G D Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate Number: Sira 19ATEX1252U Certificate Number: IECEx SIR 19.0075U
<b>CSA</b>	Class I, Division 1, Groups A, B, C, D Class II, Division 1, Group E, F, G Class III Ex db IIC Gb; Ex tb IIIC Db Class I, Zone 1, AEx db IIC Gb Zone 21, AEx tb IIIC Db IP66/IP68/TYP E 4X Tamb: -55°C to +85°C Certificate Number: CSA 19.80011200U
<b>UL</b>	Class I, Division 1, Groups A, B, C, D Class II, Division 1, Groups E, F, G Class III Class I, Zone 1, AEx db IIC Gb Zone 21, AEx tb IIIC Ex db IIC Gb; Ex tb IIIC Db IP66/IP68/TYP E 4X Tamb: -55°C to +85°C 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)
  - ICES-003 Information Technology emissions requirements (Canada)
  - AS/NZS CISPR 11 Group 1 Class A ISM emissions requirements (Australia/New Zealand)
  - EN 55011 Group 1 Class A ISM emissions requirements (EU)
  - 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:  
 Class I, Division 1, Groups B, C, D  
 Class II, Division 1, Groups E, F, G  
 Class III, Division 1, T6  
 Ex d IIC T6  
 Ta = -55°C to +75°C  
 Enclosure: Type 4X & IP66/68  
 Certificate Number: CSA 11 2325749

**ATEX** Explosion-proof for use in:  
 Ⓢ II 2 G D  
 Ex db IIC T6 Gb  
 Ex tb IIIC T85°C Db IP68  
 Ta = -55 to 75°C  
 Certificate Number: Sira 10ATEX1116X

**IECEX** Explosion-proof for use in:  
 Ex db IIC T6 Gb  
 Ex tb IIIC T85°C Db IP68  
 Ta = -55 to 75°C  
 Certificate Number: IECEX SIR 10.0056X

#### SPECIFIC CONDITIONS OF USE:

The equipment label and epoxy coated aluminum models may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.

Flameproof joints are not intended to be repaired.

All entry closure devices shall be suitably certified as “Ex d”, “Ex t” and “IP66/68” as applicable. Suitable thread sealing compound (non-setting, non-insulating, non-corrosive, not solvent based, suitable for the ambient rating) must be used at the NPT conduit entries to achieve the IPx8 rating while maintaining the Ex protection concept.

#### Year of Construction:

This information is contained within the serial number with the first four digits representing the year and month in the YYMM format.

#### For European Community:

The PD663 Series must be installed in accordance with the ATEX directive 2014/34/EU, the product certificates Sira 10ATEX1116X and IECEX SIR 10.0056X, and the product manual.

## 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
<a href="#">PDAPLUG50</a>	1/2" NPT 316 Stainless Steel Conduit Plug with Approvals
<a href="#">PDAPLUGM20</a>	M20 316 Stainless Steel Conduit Plug with Approvals
<a href="#">PDAADAPTER-50M-75F</a>	M-1/2" NPT to F-3/4" NPT Adapter with Approvals
<a href="#">PDAADAPTER-50M-M20F</a>	M-1/2" NPT to F-M20 Adapter with Approvals
<a href="#">PD9501</a>	Multi-Function Calibrator
<a href="#">PD9502</a>	Low-Cost Signal Generator
<a href="#">PDA1001</a>	USB Power Bank
<a href="#">PDA1002</a>	6" DIN Rail Mounting Kit
<a href="#">PDA1024-01</a>	24 VDC Power Supply for DIN Rail
<a href="#">PDA-SSTAG</a>	Stainless Steel Tag
<a href="#">PDA6631-SS</a>	Stainless Steel 1.5" U-Bolt Kit
<a href="#">PDA6863-SS</a>	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](http://www.P65Warnings.ca.gov)

#### Disclaimer

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