

# PD663 Explosion-Proof Loop-Powered Meter

## Data Sheet



**ProtEX™**  
Lite



IECEX C E

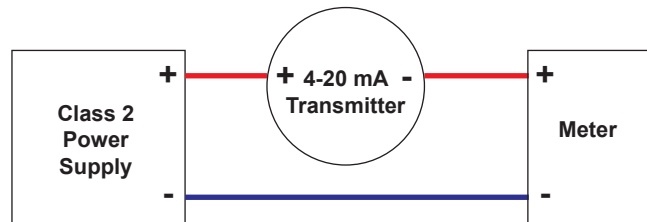
- Fully-Approved Explosion-Proof Loop-Powered Meters
- 4-20 mA Input with  $\pm 0.05\%$  Accuracy of Calibrated Span
- 1.7 Volt Drop (4.7 Volt Drop with Backlight)
- Easy Field Scaling in Engineering Units without a Calibrator
- 0.6" (15.2 mm)  $3\frac{1}{2}$ + Digits LCD Display; -1999 to 2999
- Display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

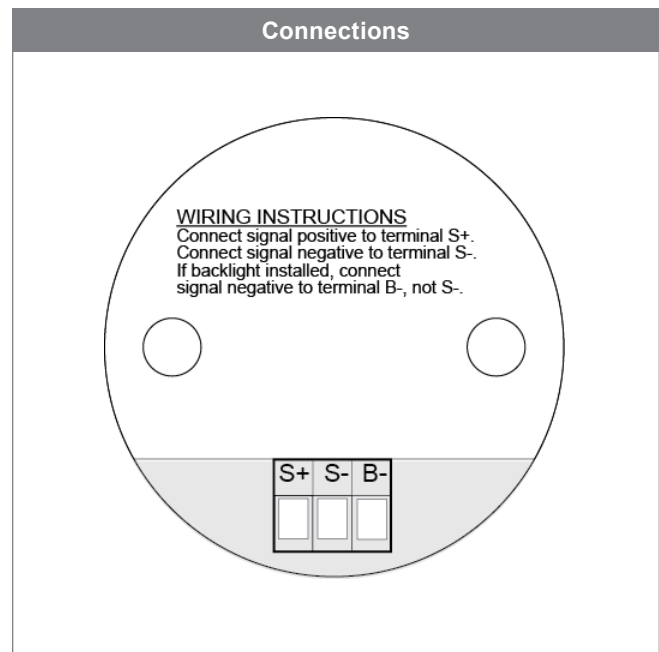


For more information on loop-powered meters, check out these white papers:

[Fundamentals of Loop-Powered Devices](#)

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

## OVERVIEW



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

The PD663 is an explosion-proof loop-powered field meter that is available in an aluminum or stainless steel enclosure.

The ProtEX-Lite carries all major approvals including:

- UL Listed as Explosion-Proof / Dust Ignition-Proof / Flame-Proof
- CSA Certified as Explosion-Proof / Dust Ignition-Proof / Flame-Proof
- ATEX and IECEx Certified as Explosion-Proof

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.





### 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

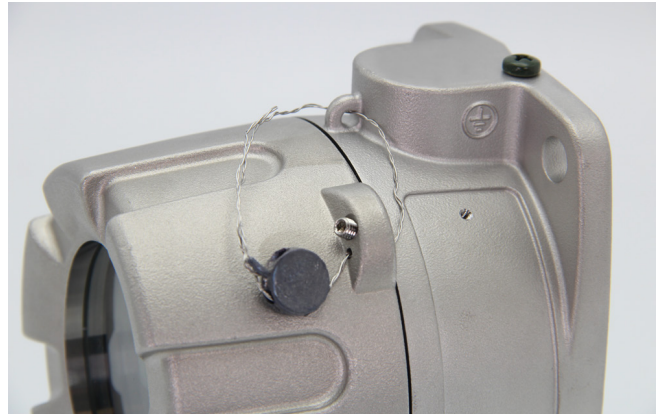
### Rotatable Display Module

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.

**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

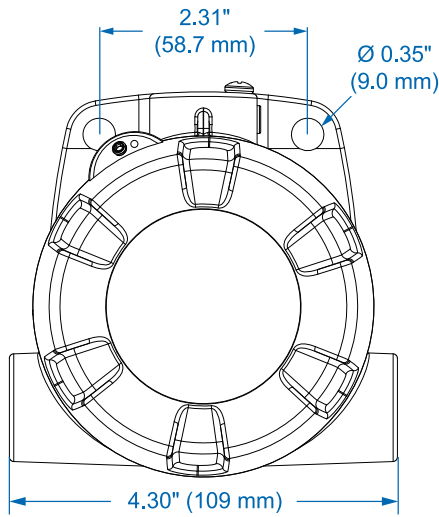
**PD9502 Low-Cost Signal Generator**



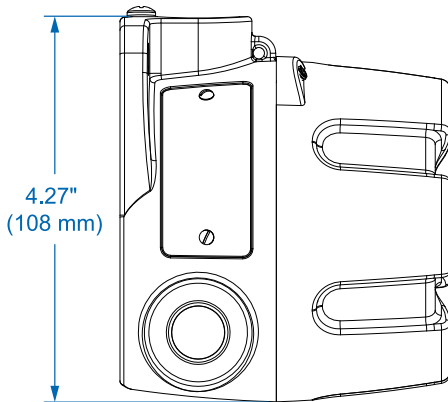
The PD9502 is a low-cost, compact, simple to use 4-20 mA or 0-10 VDC signal generator. It can easily be set for 0-20 mA, 4-20 mA, 0-10 V or 2-10 V ranges. Signal adjustment is made with a one-turn knob. A 15-27 VDC wall plug is provided with the instrument. Optional USB power bank is available.

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

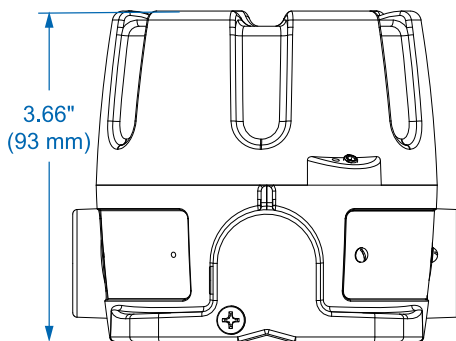
**DIMENSIONS**



Front View



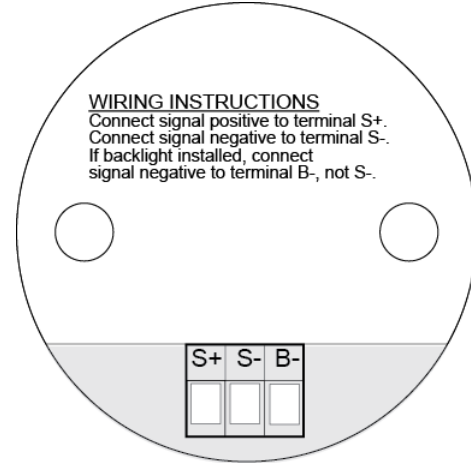
Side View



Top View

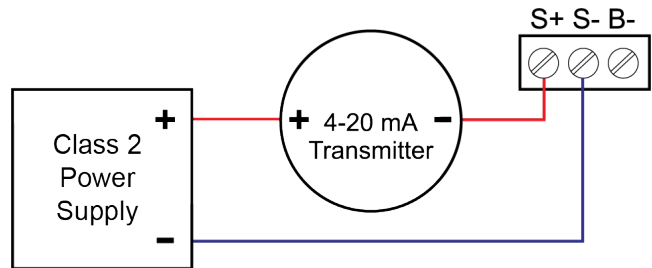
**CONNECTIONS**

**Connectors Labeling**

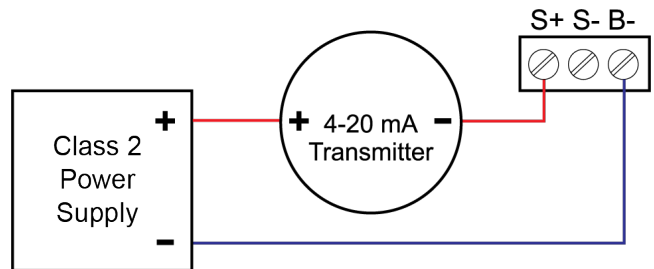


**WIRING DIAGRAMS**

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 <b>2999</b>
<b>Underrange</b>	Display flashes <b>-1999</b>
<b>Programming Method</b>	4 Internal pushbuttons (behind glass)
<b>Noise Filter</b>	Programmable <b>HI</b> , <b>LO</b> , or <b>OFF</b>
<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: -55 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 PD663-0K0-SS: Two 1/2" NPT PD663-0K0-SS-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



## 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

- UL** Explosion-Proof for use in:  
 For Class I, Division 1, Groups B, C, D  
 Class II, Division 1, Groups E, F, G  
 Class III, Division 1; T6  
 Class I, Zone 1, AEx db IIC T6 Gb  
 Zone 21, AEx tb IIIC T85°C Db  
 Tamb = -55°C to 75°C  
 UL Type 4X, IP66 / IP68  
 UL File Number: E494837
- CSA** Explosion-Proof for use in:  
 Class I, Division 1, Groups B, C and D  
 Dust Ignition-Proof for use in:  
 Class II/III, Division 1, Groups E, F and G; T6  
 Flame-Proof for use in:  
 Zone 1, Ex d IIC T6  
 Ta = -55 to 75°C  
 Enclosure: Type 4X & IP66/IP68  
 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

## 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="#">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)

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