

# PD6870 Explosion-Proof Loop-Powered Process Meter

## Data Sheet



- Fully-Approved Explosion-Proof Loop-Powered Process Meter
- 4-20 mA Input
- 1 Volt Drop (4 Volt Drop with Backlight)
- 1.0" (25.4 mm) 3½ Digits LCD Display; -1000 to 1999
- 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)
- Zero & Span Potentiometer Adjustments for Easy Field Scaling
- Conformal Coated PCBs for Dust and Humidity Protection
- CSA Certified as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof
- ATEX and IECEx Certified as Explosion-Proof
- Wide Viewing Angle
- Built-In Flange for Wall or Pipe Mounting
- Explosion-Proof, IP68, NEMA 4X Die-Cast Aluminum & Stainless Steel Enclosures
- Two 3/4" NPT or M20 Threaded Conduit Openings
- 2" U-Bolt Kits Available
- Stainless Steel Tag Available
- 3-Year Warranty

**FLUIDPRO**

Dosing Systems

[www.fluidprodosingsystems.com.au](http://www.fluidprodosingsystems.com.au)

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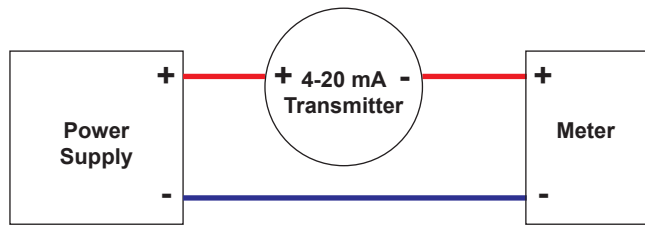


## WHY USE LOOP-POWERED METERS?

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.

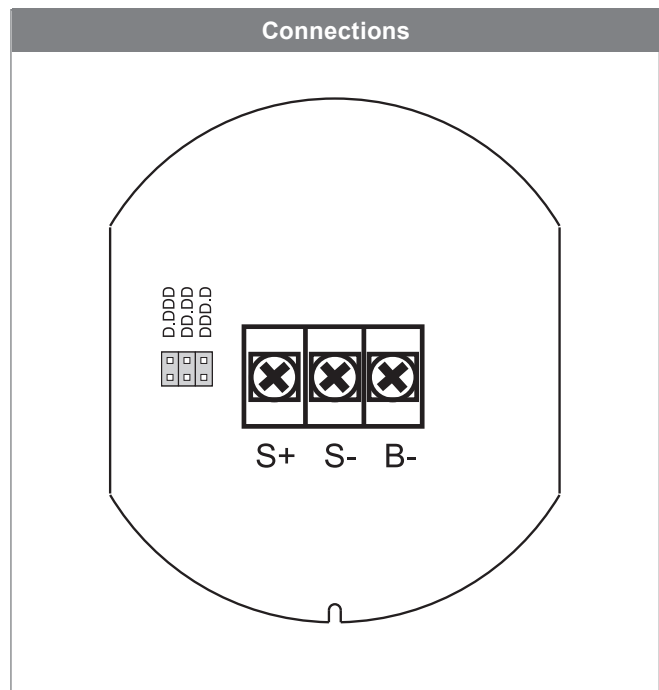
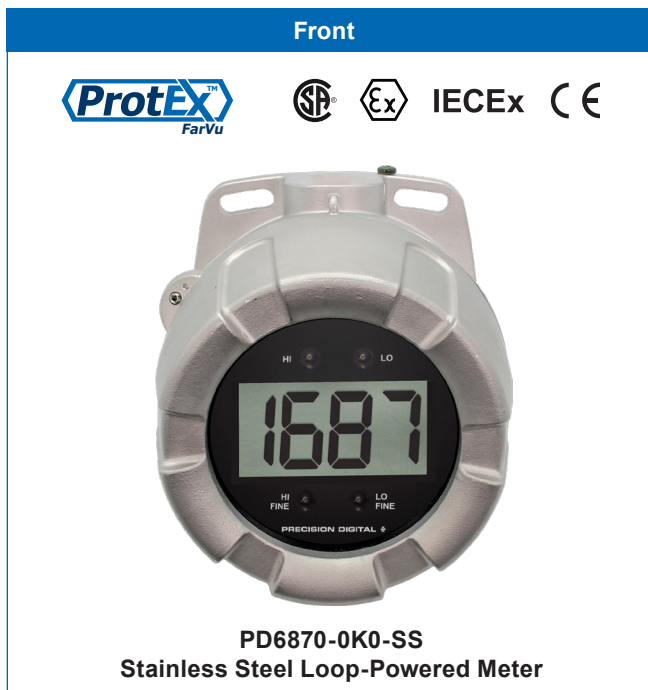


For more information on loop-powered meters, check out these white papers:

[Fundamentals of Loop-Powered Devices](#)

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

## OVERVIEW



## Hazardous Area Stainless Steel Loop-Powered Meter

The ProtEX-FarVu PD6870 is a rugged, explosion-proof, loop-powered meter with 1" display digits ideal for demanding applications in hazardous areas or in the harshest environmental conditions. The product 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. 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 meter is programmed using four easy to access front-mounted potentiometers.

The numeric display will read from -1000 to 1999 over a 2000 count user adjustable scaling span. The backlight feature lets you see the display under any lighting condition and is powered from the 4-20 mA loop with no additional power supply required. The backlight can be enabled or disabled via alternative wiring of the terminal block.

The enclosure is provided with two conduit openings. The built-in mounting flange on the enclosure makes it convenient for pipe or wall mounting.

**PHYSICAL FEATURES**

**ProtEX-FarVu Enclosures**



The ProtEX-FarVu PD6870-0K0 comes with two 3/4" NPT conduit openings and the PD6870-0K0-M20 comes with two M20 conduit openings.

**Great for Cold Temperatures**

The ProtEX-FarVu PD6870 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.



**Wide Viewing Angle**

The window and display module have been optimized to provide a wide viewing angle of approximately ±40°; nearly twice that of the competition.



## Easy Pipe Mounting

The ProtEX-FarVu comes with a built-in mounting flange. This allows for easy mounting to walls or pipes using the [PDA6846-SS](#) Stainless Steel 2" U-Bolt Kit. A slot on the back of the enclosure makes it easy to center the unit on a pipe.



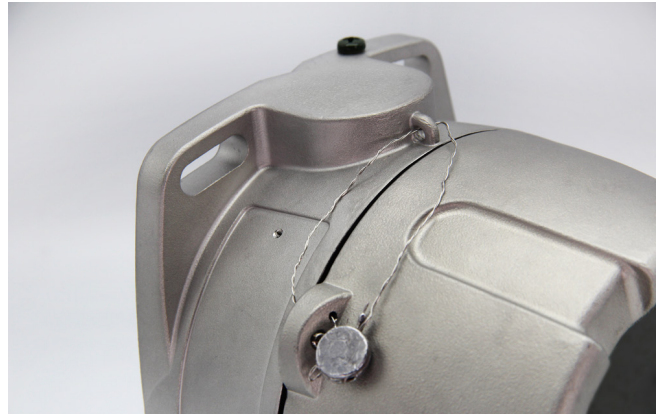
## Rotatable Display Module

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.



**ACCESSORIES**

**PDA6846-SS 2" U-Bolt Kit**



The PDA6846-SS stainless steel U-Bolt Kit provides a convenient way to mount the meter to 1.5" or 2" pipes.

Model	Description
<a href="#">PDA6846-SS</a>	2" Stainless Steel U-Bolt Kit with One U-Bolt

**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

**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

**PDA1024-01 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**

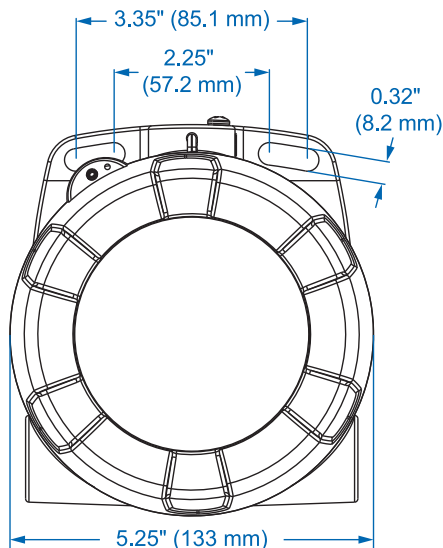


The PD9502 is a low-cost, compact, simple to use 4-20 mA or 0-10 VDC signal generator. It can easily be set for 0-20 mA, 4-20 mA, 0-10 V or 2-10 V ranges. Signal adjustment is made with a one-turn knob. A 15-27 VDC wall plug is provided with the instrument. Optional USB power bank is available.

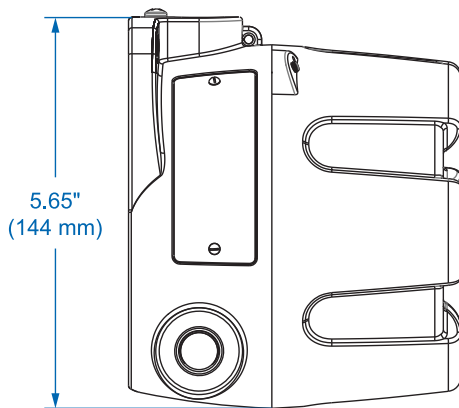
Model	Description
<a href="#">PD9502</a>	Low Cost Signal Generator
<a href="#">PDA1001</a>	USB Power Bank

**DIMENSIONS**

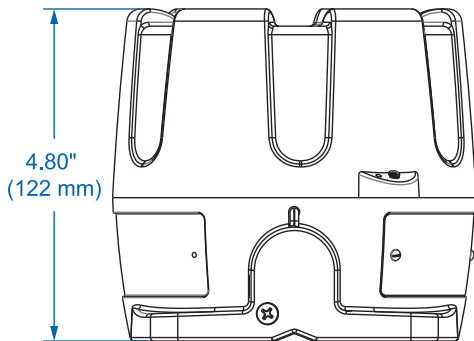
Units: Inches (mm)



Front View



Side View



Top View

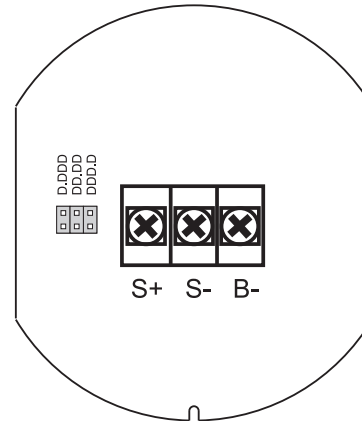


Download free 3-D CAD files of these instruments to simplify your drawings!

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

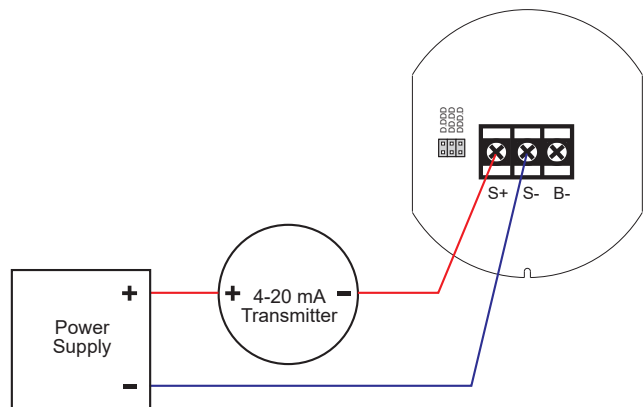
**CONNECTIONS**

**Connectors Labeling**

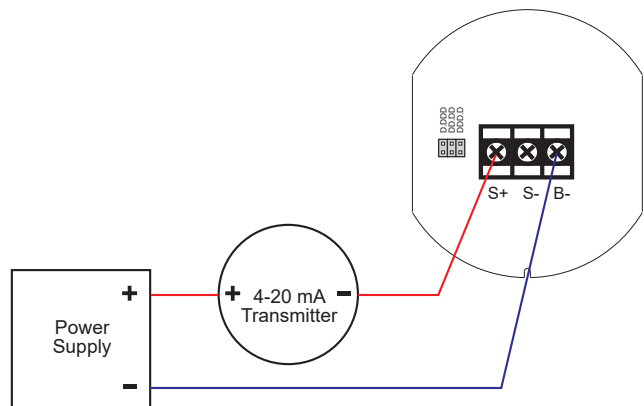


**WIRING DIAGRAMS**

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

<b>Display</b>	3½ digit LCD 1" (25.4 mm); -1000 to 1999
<b>Display Orientation</b>	Display may be mounted at 90° increments up to 270° from default orientation.
<b>Display Update Rate</b>	2.5 Updates/Second
<b>Backlight</b>	White; Loop-powered. Backlight can be enabled or disabled via alternative wiring of terminal block. Loop-powered backlight brightness will increase as the input signal current increases.
<b>Display Overrange</b>	Display reads <b>f</b> on the left most digit
<b>Programming Method</b>	Four (coarse and fine for zero and span) potentiometers accessed when the cover is removed.
<b>Recalibration</b>	Recalibration is recommended at least every 12 months.
<b>Normal Mode Rejection</b>	60 dB rejection ratio
<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. Built-in flange for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting. See Dimensions on page 6.
<b>Overall Dimensions</b>	5.25" x 5.65" x 4.80" (133 mm x 144 mm x 122 mm) (W x H x D)
<b>Weight</b>	Aluminum: 4.8 lbs (2.18 kg) Stainless Steel: 8.7 lbs (3.95 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>	±0.1% of full span ±1 count	
<b>Maximum Voltage Drop &amp; Equivalent Resistance</b>	<b>Without Backlight</b>	<b>With Loop Powered Backlight</b>
	1 VDC @ 20 mA 50 Ω @ 20 mA	4 VDC @ 20 mA 200 Ω @ 20 mA
<b>Temperature Drift</b>	150 PPM/°C from -40 to 75°C ambient	
<b>Decimal Point</b>	User selectable decimal point	
<b>Calibration Range</b>	4 mA input: -1000 to +1000; 20 mA between 20 and 2000 counts greater than 4 mA display. Two point linear display span.	
<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>	PD6870-0K0: Two 3/4" NPT PD6870-0K0-M20: Two M20 PD6870-0K0-SS: Two 3/4" NPT PD6870-0K0-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
<b>ATEX &amp; IECEx</b>	Flame-proof 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

## ORDERING INFORMATION

PD6870 Explosion-Proof Meter • Aluminum Enclosure	
Model	Description
PD6870-0K0	Explosion-Proof Loop-Powered Process Meter with Backlight and Two 3/4" Conduit Openings
PD6870-0K0-M20	Explosion-Proof Loop-Powered Process Meter with Backlight and Two M20 Conduit Openings

PD6870 Explosion-Proof Meter • Stainless Steel Enclosure	
Model	Description
PD6870-0K0-SS	Explosion-Proof Loop-Powered Process Meter with Backlight and Two 3/4" Conduit Openings
PD6870-0K0-SS-M20	Explosion-Proof 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="#">PDA6846-SS</a>	2" Stainless Steel U-Bolt Kit with One U-Bolt

**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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