

# PD663-SS Explosion-Proof Stainless Steel Loop-Powered Meter

## Data Sheet



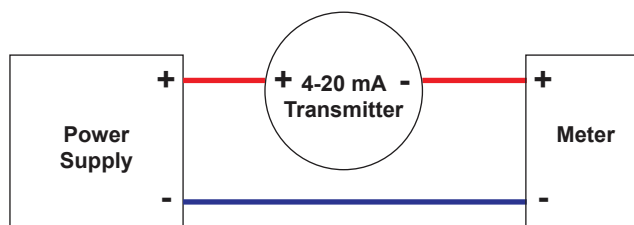
- Fully-Approved Stainless Steel Explosion-Proof Loop-Powered Meter
- 4-20 mA Input with  $\pm 0.05\%$  Accuracy of Calibrated Span
- 1.7 Volt Drop (4.7 Volt Drop with Backlight)
- Easy Field Scaling in Engineering Units without a Calibrator
- 0.6" (15.2 mm)  $3\frac{1}{2}$ + Digits LCD Display; -1999 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
- CSA Certified for Explosion-Proof / Dust-Ignition Proof / Flame-Proof
- Flanges for Wall or Pipe Mounting
- Explosion-Proof, IP68, NEMA 4X 316 Stainless Steel Enclosure
- 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.

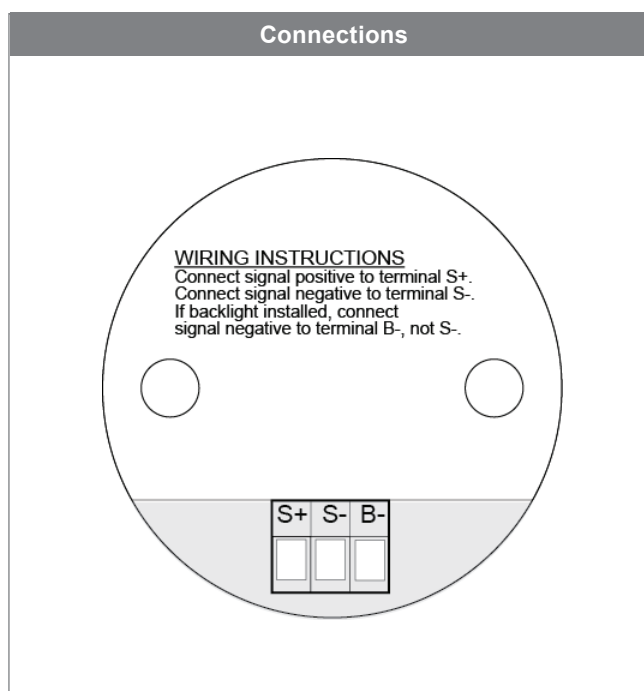
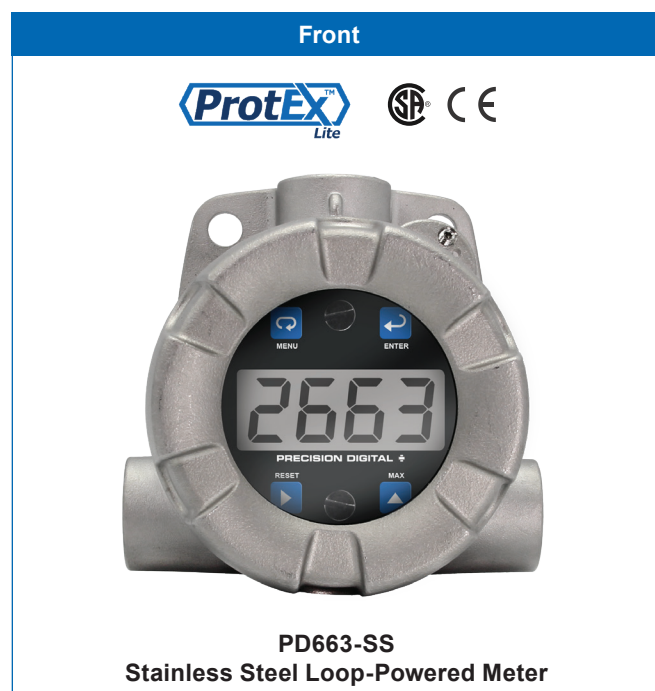


For more information on loop-powered meters, check out these white papers:

[Fundamentals of Loop-Powered Devices](#)

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

## OVERVIEW



## Hazardous Area Stainless Steel Loop-Powered Meter

The ProtEX-Lite PD663-SS is a loop-powered field meter housed in a 316 stainless steel enclosure that is CSA Certified as Explosion-Proof, Dust-Ignition Proof, and Flame-Proof. The PD663-SS 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  $-40^{\circ}\text{C}$  and can be installed in areas where the temperature gets as cold as  $-55^{\circ}\text{C}$ , 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  $75^{\circ}\text{C}$  operating temperature range and is available with two 1/2" NPT or M20 threaded conduit openings and flanges 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 Stainless Steel Enclosures



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

### Great for Cold Temperatures

The ProtEX-Lite PD663-SS 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-SS 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 cast-in mounting flang-es. These allow easy mounting to walls or pipes us-ing 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 cast-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

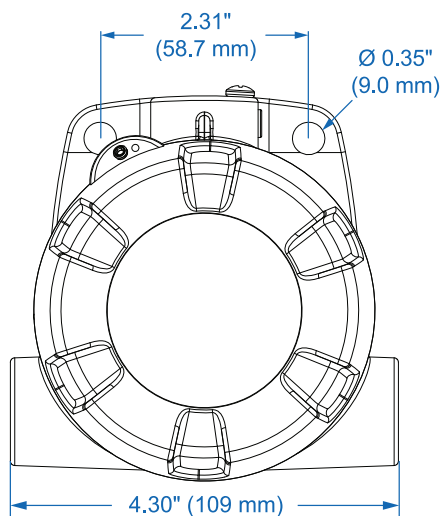


The PD9502 is a low-cost, compact, simple to use 4-20 mA or 0-10 VDC signal generator. It can easily be set for 0-20 mA, 4-20 mA, 0-10 V or 2-10 V ranges. Signal adjustment is made with a one-turn knob. A 15-27 VDC wall plug is provided with the instrument. Optional USB power bank is available.

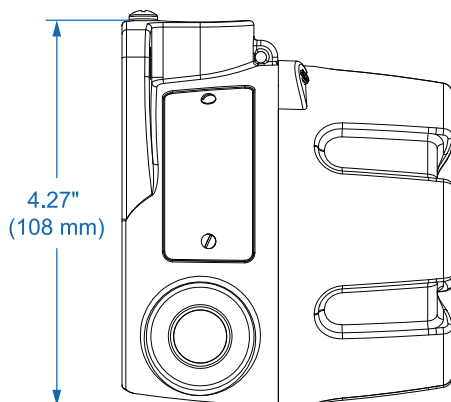
Model	Description
<a href="#">PD9502</a>	Low-Cost Signal Generator
<a href="#">PDA1001</a>	USB Power Bank

## DIMENSIONS

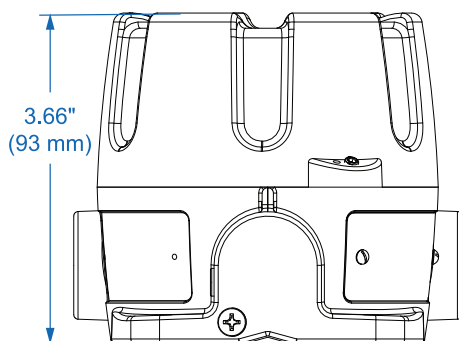
Units: Inches (mm)



Front View



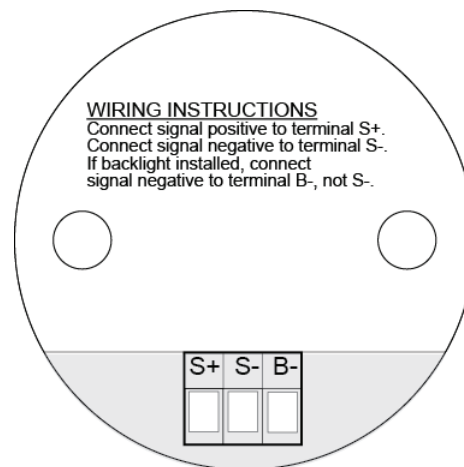
Side View



Top View

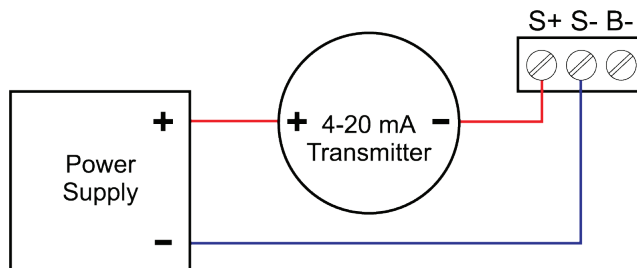
## CONNECTIONS

### Connectors Labeling

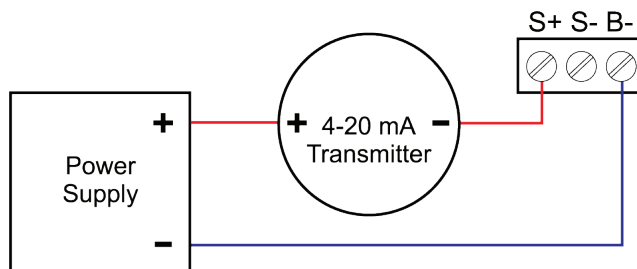


## WIRING DIAGRAMS

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 <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: -40 to 75°C Installation temperature range: -55 to 75°C Relative humidity: 0 to 90% non-condensing
<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>	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</b> 4-20 mA 0.40 mA
<b>Maximum Voltage Drop &amp; Equivalent Resistance</b>	<b>Without Backlight</b> 1.7 VDC @ 20 mA 85 Ω @ 20 mA
<b>Input Overload</b>	<b>With Loop Powered Backlight</b> 4.7 VDC @ 20 mA 235 Ω @ 20 mA
<b>HART Transparency</b>	Over current protection to 2 A max. 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>	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>	Silver
<b>Window</b>	Borosilicate glass
<b>Conduits</b>	PD663-0K0-00-SS: Two 1/2" NPT conduit openings PD663-0K0-00-SS-M20: Two M20 conduit openings
<b>Flanges</b>	Two built-in flanges provided for wall and pipe mounting.
<b>Tamper-Proof Seal</b>	Cover may be secured with tamper-proof seal.
<b>ATEX &amp; IECEx (enclosure only)</b>	Flameproof protection Ex II 2GD Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate No.: Sira 19ATEX1252U Certificate No.: IECEx SIR 19.0075U
<b>CSA (enclosure only)</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/TYPE 4X Tamb: -55°C to +85°C Certificate No.: 80011200
<b>UL (enclosure only)</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/TYPE 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

<b>Emissions</b>	EN 61326 Safety requirements for measurement, control, and laboratory use – Industrial Group 1 Class A ISM emissions requirements
<b>Radiated Emissions</b>	Class A
<b>Immunity</b>	EN 61326 Safety requirements for measurement, control, and laboratory use
<b>ESD</b>	±4 kV contact, ±8 kV air
<b>RFI – Amplitude Modulated</b>	80-1000 MHz @ 10 V/m, 1.4-2.0 GHz @ 3 V/m, 2.0-2.7 GHz @ 1 V/m, 80% AM (1 kHz)
<b>EFT</b>	±2 kV DC mains, ±1 kV other
<b>Telco Surge</b>	±1 kV
<b>CRFI</b>	3 V, 0.15-80 MHz, 1 kHz 80% AM

## Compliance Information

### Hazardous Area Approvals

<b>CSA</b>	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: 2325749
------------	--

## ORDERING INFORMATION

ProtEX-Lite PD663-SS Explosion-Proof Process Meter	
Model	Description
PD663-0K0-00-SS	Stainless Steel Explosion-Proof Loop-Powered Process Meter with Backlight and Two 1/2" Conduit Openings
PD663-0K0-00-SS-M20	Stainless Steel Explosion-Proof Loop-Powered Process Meter with Backlight and Two M20 Conduit Openings

## Accessories

General 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

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

Pipe Mounting Kits	
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.
<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.



### WARNING

Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

### Disclaimer

The information contained in this document is subject to change without notice. Precision Digital Corporation makes no representations or warranties with respect to the contents hereof, and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

©2022 Precision Digital Corporation. All rights reserved.

LDS663-SS\_B 11/22