

# MODBUS® SERIAL INPUT METER

**Snooper**

**Snooper • Model PD865**



Wireless Ready

*In Snooper mode, the PD865 listens to Modbus traffic and grabs a process variable being transmitted on the bus.*

## NEW FEATURES

- **Snooper Mode:** Listening for the PV you want
- **Proxy Polling Mode:** Poll up to 8 PVs

## FEATURES

- RS-485 Modbus® RTU input
- Six full digits 999,999
- Master, Slave, or Snooper mode
- Sunlight readable LED display
- Scale in engineering units
- 16-point linearization
- Square root & programmable exponent
- Exact display of input data
- 4-20 mA analog output option (Modbus® to 4-20 mA)
- Two Form A relays standard
- Two Form C relays option
- Up to four pump alternation control
- Universal power supply



*Great for  
Multivariable  
Transmitters!*

PRECISION DIGITAL CORPORATION

PRECISION  
DIGITAL

[www.predig.com](http://www.predig.com)

## WHAT IS A SNOOPER?

The PD865 Snooper is a digital panel meter that can be programmed as a Modbus RTU Master, Slave or Snooper.

## What Makes Snooper Mode Special?

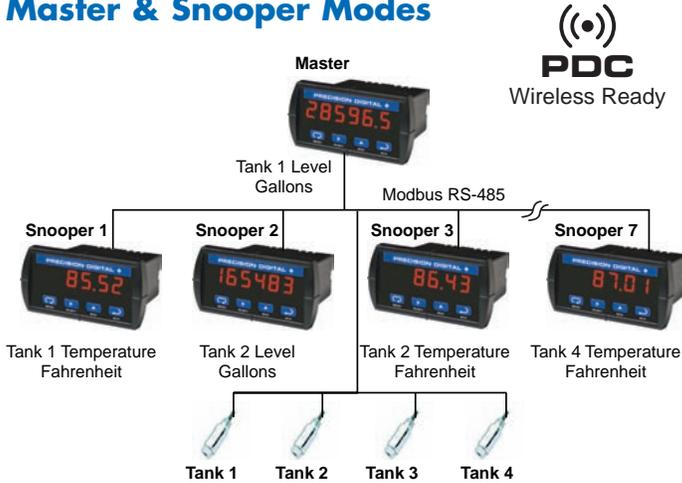
In Snooper mode, the Snooper can sit anywhere on the Modbus network and display any process variable on the bus. The special thing about Snooper mode is you don't have to change the programming of the other devices on the network. You just program the Snooper to listen for a specific address and register on the bus and it constantly monitors that location and displays the PV on the digital readout.



PD865 in Snooper Mode

## APPLICATIONS

### Master & Snooper Modes



In this application, the PD865 at the top is acting as the Master and requests eight process variables (level & temperature) by polling four multivariable tank level sensors. Seven of these variables are polled by the master on behalf of the seven PD865s acting in Snooper mode (a process called proxy polling). The seven PD865s display specific data captured during the polling process without detection by, or interfering with, either the master or slaves on the network.

### Custom Snooper in Level Application

The Snooper shown here has been modified so it displays Feet, Inches, and 16ths of an inch from a level transmitter. Please contact the factory if you have a custom application.

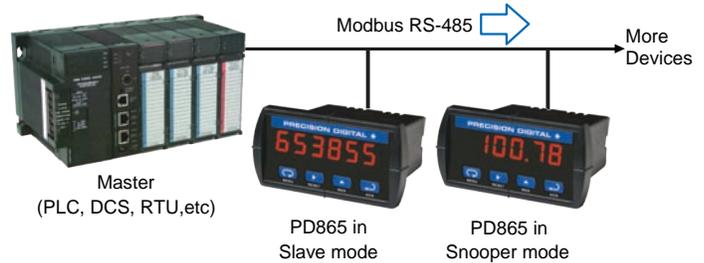


## Multivariable Level Transmitters



The top Snooper is displaying product level and it is set up as a master device to the level transmitter's slave device. The next two Snoopers are set up in Snooper mode and they are displaying interface and product temperature. Each Snooper's two relays are connected to the PD158 annunciator to indicate alarm conditions.

## In Slave & Snooper Modes with PLC Master



Keep it Simple

Keep it Digital



Many digital process meters get their 4-20 mA input from a PLC. This requires a costly analog output card in the PLC and also degrades the accuracy of the signal as it is converted from digital to analog and then back to digital. Using a Snooper in these applications means the PLC communicates digitally with the digital display.

## Modbus to 4-20 mA Converter



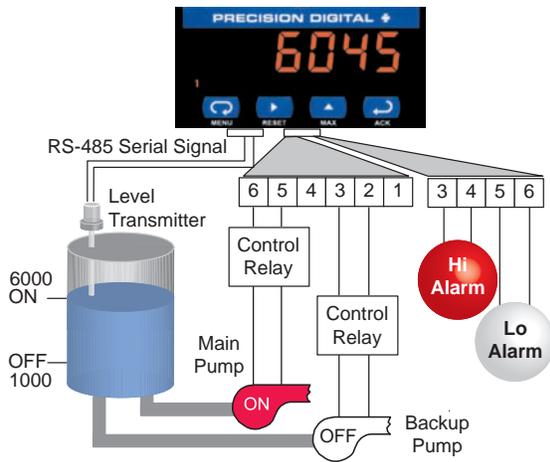
The Snooper can be equipped with a 4-20 mA output option which will convert the serial input to the Snooper into an isolated 4-20 mA output.

## Remote Modbus Display for Process Meter



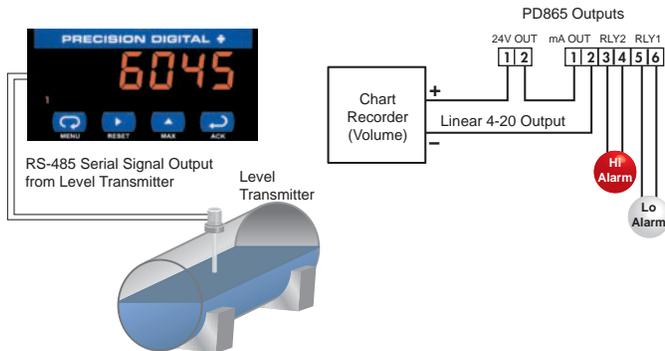
The Snooper can be connected to the Modbus serial output from devices like digital panel meters, temperature controllers, flow indicators, etc to provide indication of the process at another location. The advantage of going digital, is both indicators always read the same value. If an analog output is used, the two displays often read different values.

## Alternate up to Four Pumps



The Snooper, in conjunction with a Modbus output level transmitter, can be used to control and alternate up to four pumps. In the application above, the Snooper's two Form C relays are being used to control and alternate the Main and Backup pumps, and the Snooper's two Form A relays are being used for High and Low Alarm.

## Multi-Point Linearization



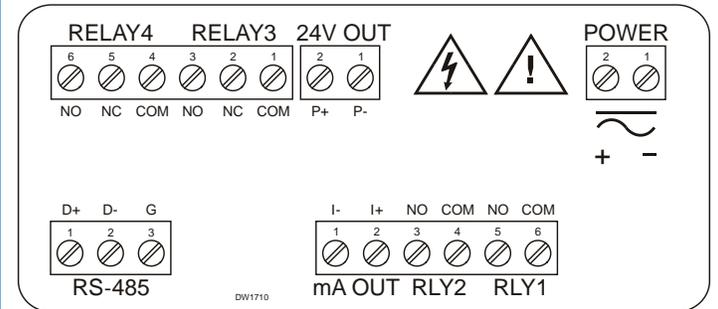
The Snooper's multi-point linearization feature can be used to display the volume in a round horizontal tank or any other non-linear vessel. In addition, it can generate a 4-20 mA output that is linear to volume.

## ORDERING INFORMATION

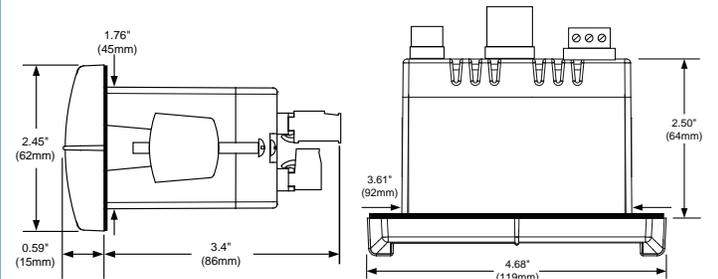
Snooper • Model PD865		
85-265 VAC**	12-36 VDC**	Options Installed
<b>Model</b>	<b>Model</b>	
PD865-6R2-06		None
PD865-6R5-16		4-20 mA Output & 24 VDC Transmitter Supply
PD865-6R7-16		2 Relays, 4-20 mA Output & 24 VDC Transmitter Supply
	PD865-7R5-06	4-20 mA Output
	PD865-7R7-06	2 Relays & 4-20 mA Output
All models are supplied with 2 Form A relays.		
**May be powered from AC or DC, see Specifications for details.		

Accessories	
Model	Description
PDA7485-I	RS-232 to RS-422/485 Isolated Converter
PDA7485-N	RS-232 to RS-422/485 Non-Isolated Converter
PDA8485-I	USB to RS-422/485 Isolated Converter
PDA8485-N	USB to RS-422/485 Non-Isolated Converter
PDX6901	Suppressor (snubber): 0.01 µF/470 Ω, 250 VAC

## CONNECTIONS



## MOUNTING DIMENSIONS



- Notes:
1. Panel cutout required: 1.772" x 3.622" (45 mm x 92 mm)
  2. Panel thickness: 0.040" - 0.250" (1.0 mm - 6.4 mm)
  3. Mounting brackets lock in place for easy mounting

## 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. © 2008-2016 Precision Digital Corporation. All rights reserved.

## SPECIFICATIONS

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

### General

**Input/Output:** Modbus RTU RS-485  
**Display:** 0.56" (14.2 mm) red LED, 6 digits; displays from -199999 to 999999, automatic leading zero blanking  
**Display Intensity:** Eight user selectable intensity levels  
**Display Decimal Point:** Up to five decimal places: d.ddddd, dd.dddd, ddd.d, dddd.dd, dddd.d, or dddd  
**Float Decimal Point:** Select the number of decimals to use for the floating point data expected from the slave or master device  
**Front Panel:** NEMA 4X, IP65; panel gasket provided  
**Programming Methods:** Four front panel buttons or via Modbus registers (Slave mode only)  
**Scaling:** Input may be scaled from -199,999 to 999,999  
**Math Functions:** Linear, square root, or programmable exponent from 0.50000 to 2.99999  
**Multi-Point Linearization:** 2 to 16 points  
**Noise Filter:** Programmable 2 to 199 (0 will disable filter)  
**Bypass:** 0.2 to 99.9% of full-scale  
**Cutoff:** 0 to 999999; 0 disables cutoff  
**Display Update Rate:** Master: 10/sec to once every 25.5 seconds; Slave and Snooper: Dependent on master device (PLC, DCS, RTU, etc)  
**Overrange:** Display flashes 999999  
**Underrange:** Display flashes -199999  
**Max/Min Display:** Stored until reset by user or meter is turned off  
**Password:** Restricts modification of programmed settings.  
**Non-Volatile Memory:** Settings stored for a minimum of 10 years.  
**Power Options:** 85-265 VAC, 50/60 Hz; 90-265 VDC, 20 W max or 12-36 VDC; 12-24 VAC, 6 W max.  
**Required Fuse:** UL Recognized, 5 A max, slow-blow; up to 6 meters may share one fuse.  
**Normal Mode Rejection:** 64 dB at 50/60 Hz  
**Transmitter Supply:** Isolated 24 VDC  $\pm 10\%$  @ 200 mA max  
**Isolation:** 4 kV input/output-to-power line, 500 V input-to-output or output-to-24 VDC supply  
**Operating Temperature:** -40 to 65°C  
**Storage Temperature:** -40 to 85°C  
**Relative Humidity:** 0 to 90% non-condensing  
**Connections:** Removable screw terminals accept 12 to 22 AWG  
**Enclosure:** 1/8 DIN, high impact plastic, UL 94V-0, color: gray  
**Weight:** 9.7 oz (275 g) (including options)  
**UL File Number:** E160849; 508 Industrial Control Equipment  
**Warranty:** 3 years parts & labor

### Operating Modes

**Master:** Processes data read from a Modbus RTU slave device (only one process variable at a time can be displayed on the master).  
**Master Proxy Polling:** Polls up to 8 process variables from up to 8 slave devices. The Master processes and displays one PV and allows other PD865s in Snooper mode to read any of the variables being polled.  
**Snooper:** Listens to the Modbus traffic and picks up a specific process variable (or any other register) being polled by a Master device from a specific slave device and processes the data being read.  
**Slave:** Processes data sent from a Modbus RTU master device.  
 Note that the relays and the 4-20 mA output are functional in all modes.

### Master and Snooper Modes Settings

**Function Code:** Modbus function code 03 or 04  
**Number of PVs:** Number of process variables to be polled (PV1-PV8)  
**Slave ID:** Address (1-247) of up to 8 slave devices  
**Register Number:** 1 to 65536. Specifies which register(s) to read in the slave device. Register number is preceded by register type (3xxxxx or 4xxxxx). Five or six digit register number allowed.  
**Data Type:** Select the data format that the slave device uses; select between Short (2 byte) and Long (4 byte) Integers or Floating point (4 byte), Signed or Unsigned (integer only), and byte order (big-endian vs little-endian).  
**Slave Response Timeout:** 0 to 25.4 seconds. This is the time allowed for slave to respond to a command. 0 disables timeout. (Master Mode Only)  
**Poll Time:** 0.1 to 25.5 seconds between read commands.

### Relays

**Rating:** 2 Form A (SPST) standard; 2 Form C (SPDT) optional; rated 3 A @ 30 VDC or 3 A @ 250 VAC, resistive loads; 1/14 HP @ 125/250 VAC inductive loads  
**High or Low Alarm:** User may program any alarm for high or low  
**Deadband:** 0-100% FS, user selectable  
**Relay Operation:**  
 1. Automatic (non-latching)  
 2. Latching  
 3. Pump alternation control (up to 4 relays)  
**Relay Reset:** Selectable via front panel or Modbus registers  
 1. Automatic reset only (non-latching)  
 2. Automatic plus manual reset at any time (non-latching)  
 3. Manual reset only, at any time (latching)  
 4. Manual reset only after alarm condition has cleared (latching)  
**Automatic Reset:** Relays reset when input passes the reset point  
**Manual Reset:** Front panel button, Modbus registers (Slave only)  
**Time Delay:** 0 to 199 seconds, on and off delays, programmable and independent for each relay  
**Fail-Safe Operation:** Programmable, independent for each relay  
**Communications Break:** No change, Relay on, or Relay off. Controls the condition the relay goes to when a slave device does not reply (Master and Snooper modes).  
**Auto Initialization:** When power is applied to the meter, relays will reflect the state of the input to the meter.

### Serial Communications

**Compatibility:** EIA-485 (RS-485)  
**Protocol:** Modbus RTU  
**Slave ID or Address:** 1 to 247. Specifies the ID or address of the slave device (Master and Snooper modes) or the address of the PD865 (Slave mode).  
**Baud Rate:** 300 to 19,200 bps  
**Data:** 8 bits (1 start bit, 1 stop bit; 1 or 2 stop bits with no parity)  
**Parity:** None, even, or odd. 1 or 2 stop bits selectable for None.  
**Byte-to-Byte Timeout:** 0.01 to 2.54 seconds  
**Turn Around Delay:** Less than 2 ms (fixed)

### Isolated 4-20 mA Transmitter Output

**Scaling Range:** 1.000 to 23.000 mA; reverse scaling allowed.  
**Calibration:** Factory calibrated 4.000 to 20.000 mA  
**Accuracy:**  $\pm 0.1\%$  FS  $\pm 0.004$  mA  
**Recalibration:** Recommended at least every 12 months.  
**Temperature Drift:** 50 PPM/°C from 0 to 65°C ambient  
**Transmitter Supply:** Isolated 24 VDC  $\pm 10\%$  @ 200 mA max  
**Isolation:** 500 V input-to-output or output-to-24 VDC supply; 4 kV output-to-power line  
**External Loop Power Supply:** 35 VDC maximum  
**Output Loop Resistance:**

Power Supply	Loop Resistance	
	Minimum	Maximum
24 VDC	10 $\Omega$	700 $\Omega$
35 VDC (external)	100 $\Omega$	1200 $\Omega$

**Data Source:** Display value, maximum display value, minimum display value, or Modbus register  
**Overrange:** Programmable mA output for overrange condition  
**Underrange:** Programmable mA output for underrange condition  
**Communications Break:** Programmable mA output when a slave device does not reply within the Slave Response Timeout  
**Maximum Output:** Programmable absolute maximum mA output  
**Minimum Output:** Programmable absolute minimum mA output

LDS865\_E 01/16