

**PRECISION  
DIGITAL**

PRECISION DIGITAL CORPORATION  
Since 1974

**SOLUTIONS GUIDE**

# Enhance Your 4-20 mA Loop with a Precision Digital Meter or Controller

- ✓ Built-in Power Supply for Transmitter
- ✓ Relays for Control & Alarm
- ✓ Local Display for Just About Anywhere

IECEX     



1-800-343-1001

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



**Jeffrey Peters**  
President

Over the 45 years we have been in business our customers have provided us with numerous ideas to make our products more useful to them. Perhaps the feature customers find most useful is the built-in 24 VDC power supply we introduced in 1984 that we provide on our line-powered process meters. This feature simplifies wiring and saves the cost of an external power supply.

This Solutions Guide is designed to showcase how customers use our products in real-world applications. For instance, one very popular application for our products is level display, control and alarm. Our products can be used as pump controllers with pump alternation, status indicators for level switches, and can display in both decimal and feet and inches format.

I hope you find this Solutions Guide helpful and if you have any ideas for new products or product enhancements, please feel free to contact me.

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### Light / Horn Accessory

Helios and Enclosures can be equipped with a Light / Horn and Reset Button for audible and visual ways to indicate alarms. Available in various color combinations.

## Cool New 4-20 mA Tools For Your Bench & Toolbox



PD9502  
\$99



PD9501  
\$599

### Multi-Function Calibrator

Features a variety of signal measurement and output functions.

- Measure & Source T/Cs, RTDs, Ohms, Current, Voltage
- 24 V Power to Drive the Transmitter
- Auto Stepping & Auto Ramping



PD420  
\$149

### 4-20 mA Set-Point Generator

Panel mount device generates a 4-20 mA signal to input to another device.

- 4-20 mA or 3-21 mA Output Ranges
- Built-in Dial for Changing Output
- Coarse or Fine Set Point Adjustment
- 15-30 VDC Power Requirement

### Low-Cost Signal Generator

A compact, simple to use 4-20 mA or 0-10 VDC signal generator.

- Wall Plug & Signal Cables Provided
- 4-Digit LED Display
- One-Turn Adjustment Knob
- 15-27 VDC power or USB Power Bank



PDA1001  
\$19

### USB Power Bank

A portable USB power bank that can conveniently provide power to the PD9502.

- Provide power to the PD9502 for 6+ hours
- USB to Micro USB cable included

*Do you want to stop climbing tanks to get level measurements?*

### Hazardous Area Level Display in Tank Farm

The PD6801 displays level in feet and inches for those who prefer that format over decimal. It is loop-powered so no additional wiring or power is needed.

-40 to 75°C operation

**Products**

PD2-6001, PD6001, PD6603, PD6701.

**Hazardous Area:** PD6607, PD6801, PD8-6001.



### Powering Up the Level Transmitter

One of the most useful features found on all of our line-powered level meters is a built-in isolated, 24 VDC power supply to power up the level transmitter.

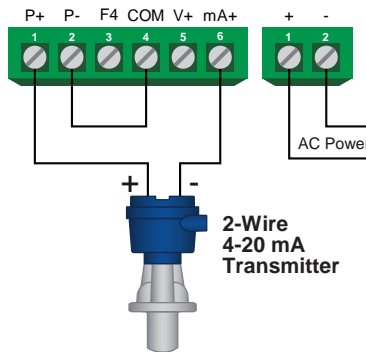
This feature saves money by eliminating the need for an external power supply. Plus, it simplifies wiring by reducing the number of devices in the loop.

**Products**

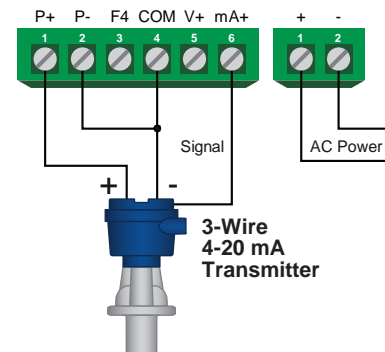
PD2-6000, PD2-6001, PD2-6060, PD765, PD6000, PD6001, PD6060.

**Hazardous Area:** PD8-765, PD8-6000, PD8-6001, PD8-6060.

*How were you planning to power your transmitter?*



**2-Wire Transmitter Connections**



**3-Wire Transmitter Connections (Provides up to 200 mA)**

### Dual-Scale Feature

This unique feature lets you display the measured input in two different ways. Both display lines are scaled independently and are based on the 4-20 mA input signal.

**Products**

PD2-6000, PD6000, PD6602, PD6603, PD6604. **Hazardous Area:** PD6606, PD6607, PD6608, PD8-6000.



**Gallons & Percent Full**



**Gallons & Height**

*Now you know how much is in the tank, and how full it is.*

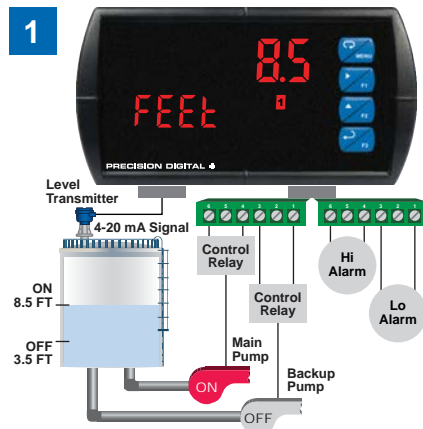
# Pump Control with Alternation of up to 8 Pumps

Many simple pump control applications don't require the sophistication and complexity of a PLC.

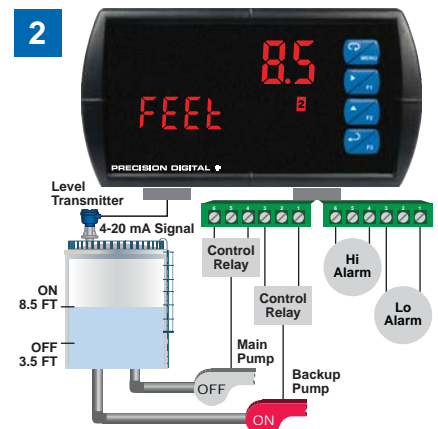
## How It Works

The meter powers up the level transmitter. The meter displays the level in feet. Two relays are set up to control and alternate the main and backup pumps, while two other relays are used for high and low alarms.

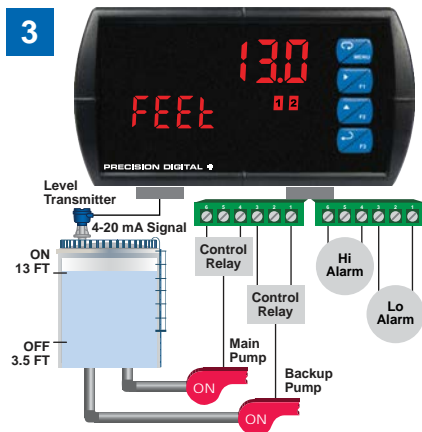
*What are you doing for sump-pump control?*



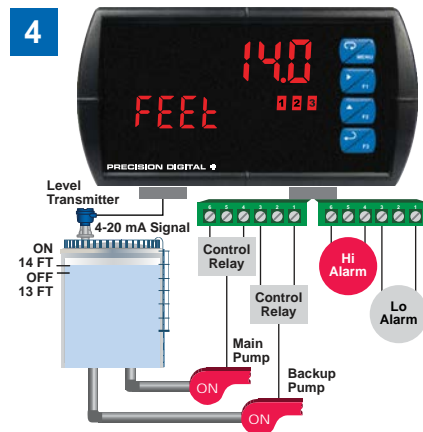
Relay #1 turns the main pump on at 8.5 feet and turns it off at 3.5 feet.



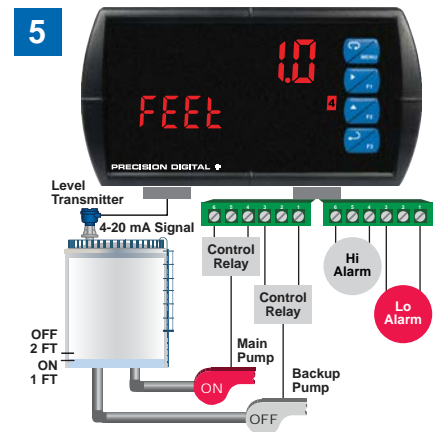
With the Pump Alternation feature activated, the next time the level reaches 8.5 feet, relay #2 transfers and starts the backup pump.



If the backup pump is not able to keep up, and the level reaches 13 feet, then relay #1 transfers and starts the main pump as well.



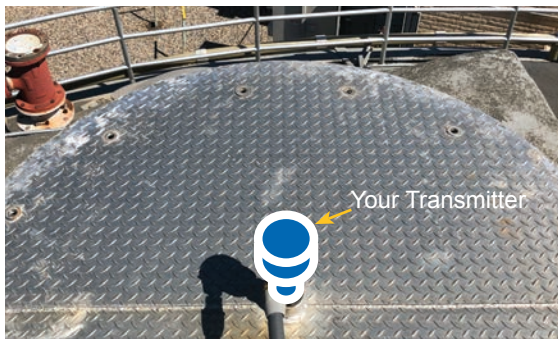
Relay #3 trips the High Level Alarm at 14 feet and resets at 13 feet.



If the Main Pump fails to turn off, Relay #4 trips the Low Level Alarm at 1.0 foot to warn against the pump running dry.

## Products

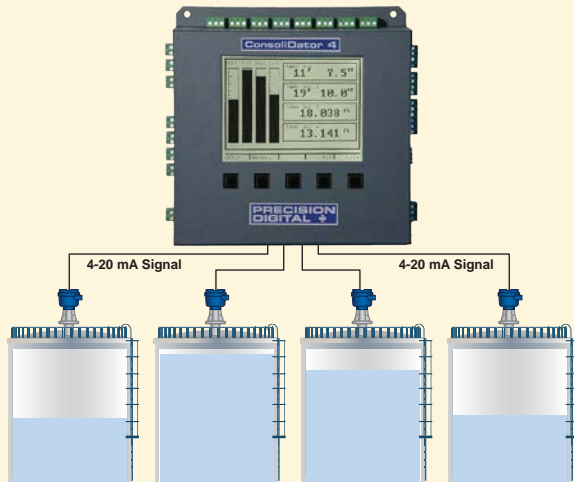
PD2-6000, PD2-6001, PD2-6060, PD765, PD6000, PD6001, PD6060, PD6602, PD6603, PD6604. **Hazardous Area:** PD6606, PD6607, PD6608, PD8-765, PD8-6000, PD8-6001, PD8-6060.



## Meter in Enclosure with Light / Horn on Side of Tank

The meter provides convenient tank side level indication, while the light/horn offers visible and audible ways to indicate alarm conditions.

## Tank Farm



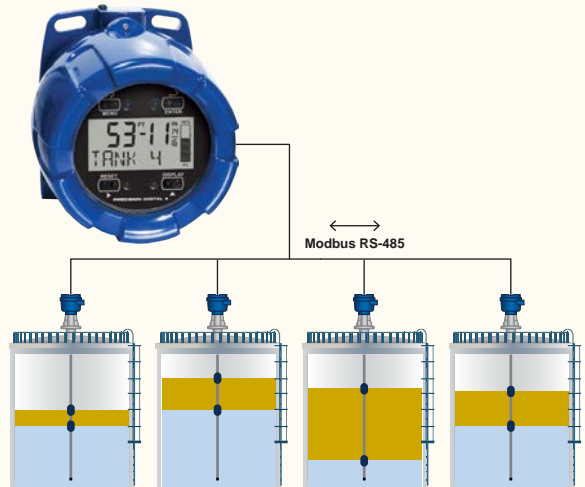
### Level Monitoring of Multiple Tanks

Use the ConsoliDator to display up to eight tanks from 4-20 mA signals on one convenient screen with numerical and bargraph representation. Relays and 4-20 mA outputs available.

#### Products

PD940, PD941, PD980, PD981, PD9000.

## Level, Temperature & Interface



### Modbus Scanner

Use our Modbus scanners to display level, interface level, temperature and other variables from multivariable level transmitters. Scan up to 16 Modbus process variables.

#### Products

PD2-6080, PD2-6081, PD6080, PD6081, PD6088, PD6089, PD6730X. **Hazardous Area:** PD8-6080, PD8-6081, PD6830X.



## Tank Height

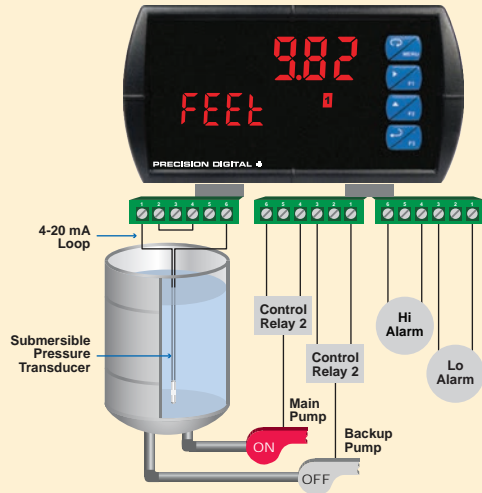
### Display Tank Height in Feet & Inches Outdoors Next to Tank

This Helios Large Display Meter is mounted high-up on a building next to the tank so it can be read from a distance. This particular Helios displays in feet and inches because that is how the customer is used to seeing their levels displayed. Line 2 can be programmed to toggle between units (LEVEL) and percent full or volume if dual-scale mode is enabled.

#### Products

PD2-6001, PD2-6081, PD6001, PD6081, PD6089, PD6603, PD6701, PD6730X. **Hazardous Area:** PD8-6001, PD8-6081, PD6607, PD6801, PD6830X.

## Pressure Transducers



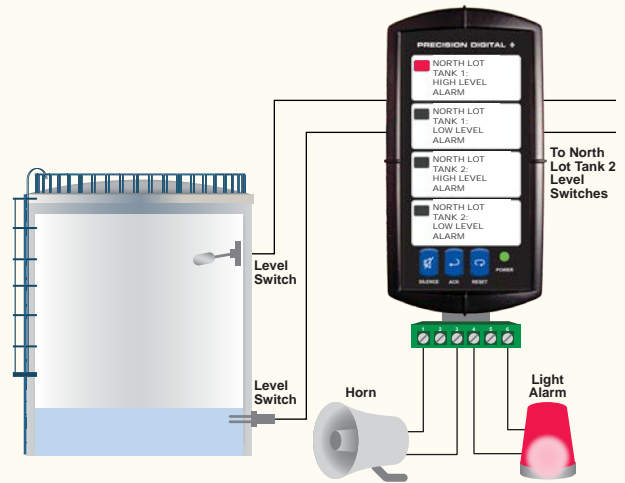
### Submersible Pressure Transducer

Combine a Precision Digital meter with a submersible pressure transducer for a great way to measure and control level in a tank, sump, well, lift station, etc. Our meters provide power to the pressure transducer and relays for alarm and control.

#### Products

PD2-6000, PD2-6001, PD2-6060, PD765, PD6000, PD6001, PD6060. **Hazardous Area:** PD8-765, PD8-6000, PD8-6001, PD8-6060.

## Point Level



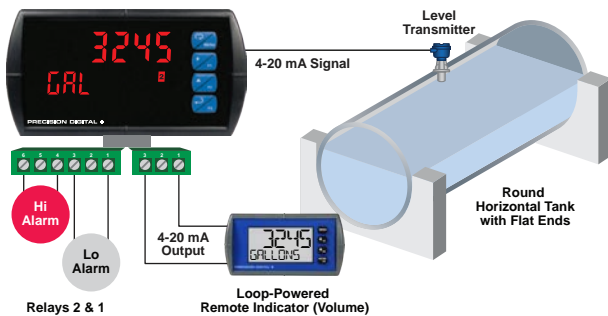
### Level Switch Monitoring & Annunciation

Use our Vigilante 1/8 DIN or explosion-proof annunciators to indicate the status of up to eight level switches. Free custom labels, variety of alarm sequences, front panel Silence, Ack & Reset buttons and 2 relays to drive external devices like horns or lights.

#### Products

PD154, PD158. **Hazardous Area:** PD8-154, PD8-158.

## Volume of Non-Linear Tanks



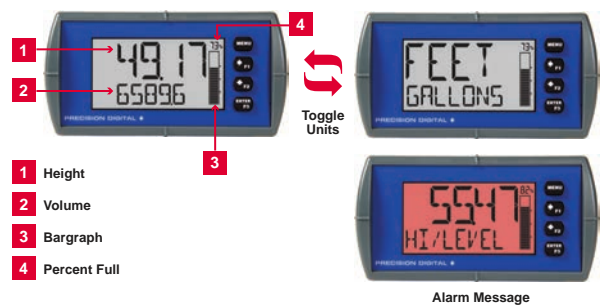
### Round Horizontal Tanks

Automatically calculate the volume in a round horizontal tank with flat ends with the Round Horizontal Tank feature. Just enter diameter & length of tank and results are calculated in US gallons. For other non-linear tanks use 32-point linearization.

#### Products

PD2-6000, PD2-6060, PD6000, PD6060, PD6602, PD6604. **Hazardous Area:** PD6606, PD6608, PD8-6000, PD8-6060.

## 4 Ways to Display Level



### Dual-Line Bargraph Displays

Display line 1 indicates height, while display line 2 displays volume. The bargraph shows how full the tank is. The meter can also toggle between value and engineering units. Finally, the red backlight with a message flashes on alarm.

#### Products

PD6603, PD6604. **Hazardous Area:** PD6607, PD6608.

Is your flowmeter mounted in a place where it is hard to see its built-in display?

## Display Rate and Total at the Same Time



### Dual-Line Display

Makes it possible to show rate and total from a pulse or 4-20 mA signal at the same time. Grand total can also be displayed, plus engineering units.

#### Products

PD2-6200, PD2-6300, PD2-6262, PD2-6363, PD6200, PD6300, PD6262, PD6363, PD6622, PD6624, PD6720. **Hazardous Area:** PD6626, PD6628, PD6820, PD8-6200, PD8-6300, PD8-6262, PD8-6363.

## Convert Pulse to 4-20 mA with PD6300



### Pulse Converter

The PD6300 accepts the pulse output from a flowmeter and with the appropriate option installed can convert the pulse to a 4-20 mA signal. The 4-20 mA signal can be programmed to correspond to either the flow rate or the total flow.

#### Products

PD2-6300, PD2-6363, PD6300, PD6363, PD6730. **Hazardous Area:** PD6830, PD8-6300, PD8-6363.

## Open Channel Flow



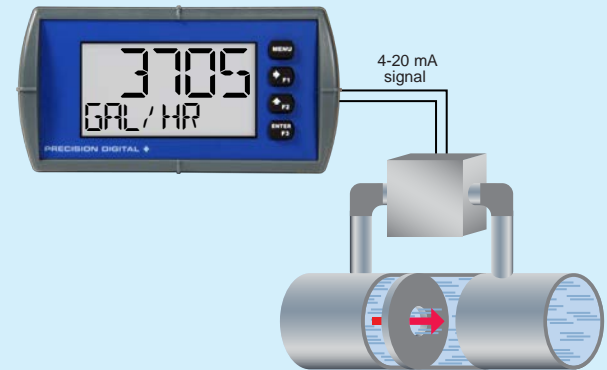
### Programmable Exponent Function

Using a level sensor to measure the height in a weir, the meter converts that signal to flow rate using the programmable exponent function. Simply input the corresponding exponent for the weir and the meter converts the signal to flow.

#### Products

PD2-6200, PD2-6262, PD6200, PD6262, PD6622, PD6624, PD6700, PD6720. **Hazardous Area:** PD6626, PD6628, PD6800, PD6820, PD8-6200, PD8-6262.

## Differential Pressure Flow



### Square Root Extraction

Extract the square root from the 4-20 mA signal from a differential pressure transmitter and the meter displays flow rate. The user selectable low-flow cutoff feature gives a reading of zero when the flow rate drops below a user selectable value.

#### Products

PD2-6200, PD2-6262, PD6200, PD6262, PD6622, PD6624, PD6700, PD6720. **Hazardous Area:** PD6626, PD6628, PD6800, PD6820, PD8-6200, PD8-6262.



## Batch Control

Our batch controllers are available for single stage applications and multi-stage batching from pulse or 4-20 mA signals.

### How It Works

Operation is quick and easy, right out of the box, with the START, BATCH, and STOP buttons pre-programmed for batch controlling. Preclose relays can be used to slow product flow for more accurate batch finish. Automatic overrun correction keeps batch sizes accurate even over time and with system wear.

### Benefits

- Single or multi-stage batch control (up to 8 relays)
- Start / Pause / Stop, change Batch with front buttons
- Automatic overrun correction
- Automatic or manual batch control
- Low or high flow alarms while batching
- Panel mount, wall mount or exp-proof
- NTEP Weights and Measures approved models available

### Products

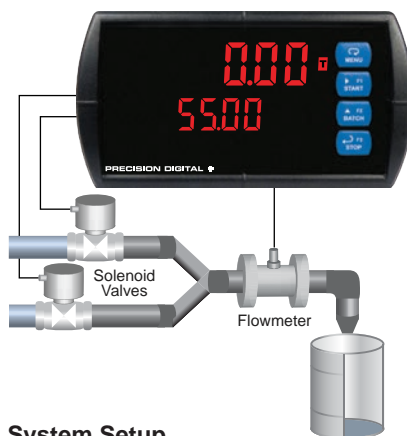
PD2-6210, PD2-6310, PD6210, PD6310, PD6310-WM, PD6622, PD6624. **Hazardous Area:** PD8-6210, PD8-6310, PD8-6310-WM, PD6626, PD6628.

## Control Stations



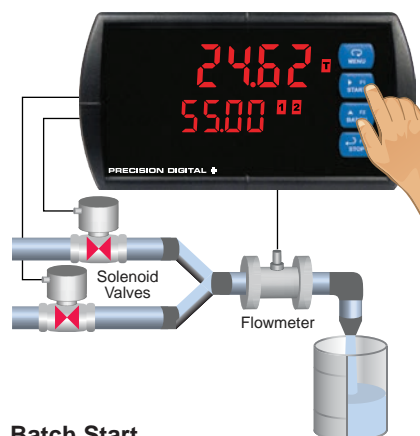
### PDA2360 Series

Remotely control devices, acknowledge relays, operate batch controllers, reset total.



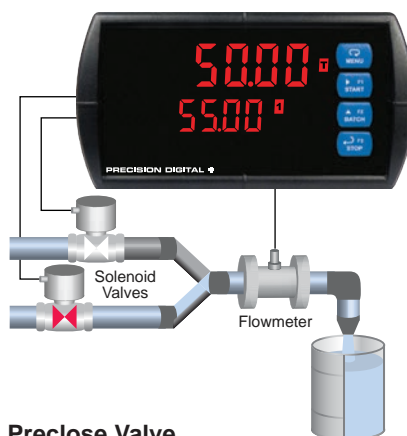
### System Setup

Both valves are closed with an empty barrel in place. The batched total is displayed in the upper display, the preset is selected for the lower display.



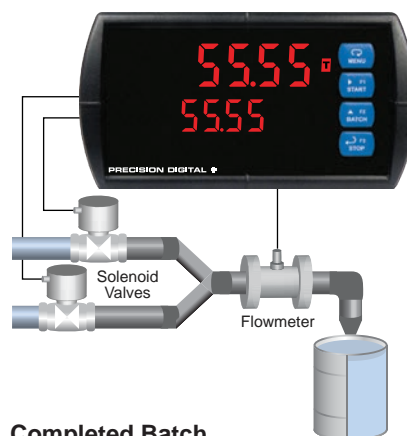
### Batch Start

The START button is pressed. Both valves open. The barrel begins to fill.



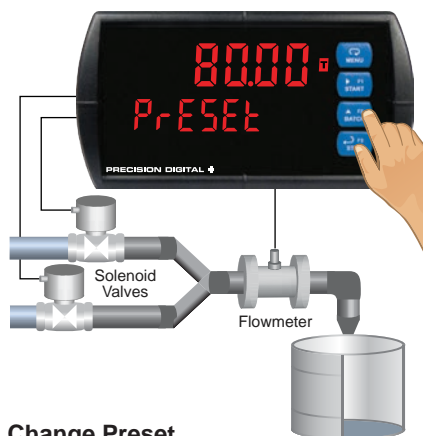
### Preclose Valve

When the batch total reaches a value of 50.00 (Preset [55.00] – Preclose [5.00]) the full-flow valve closes. The fill rate of the tank slows as a result.



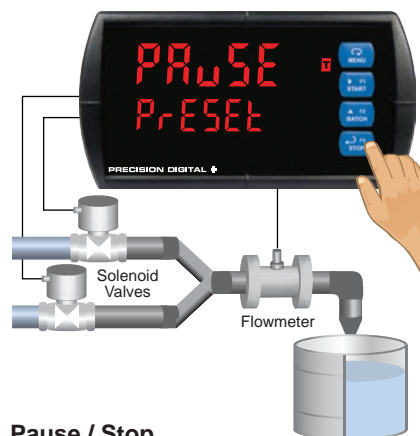
### Completed Batch

When the batch is complete, the restricted-flow valve closes. If overrun occurs, then the next batch will adjust for this offset amount to maintain accuracy.



### Change Preset

After placing a new, empty barrel, a new preset fill amount may be selected with the Batch key, while the process is stopped.



### Pause / Stop

At any time, the STOP button may be pressed, once to Pause the process, or twice to cancel the batch, which stops the process.

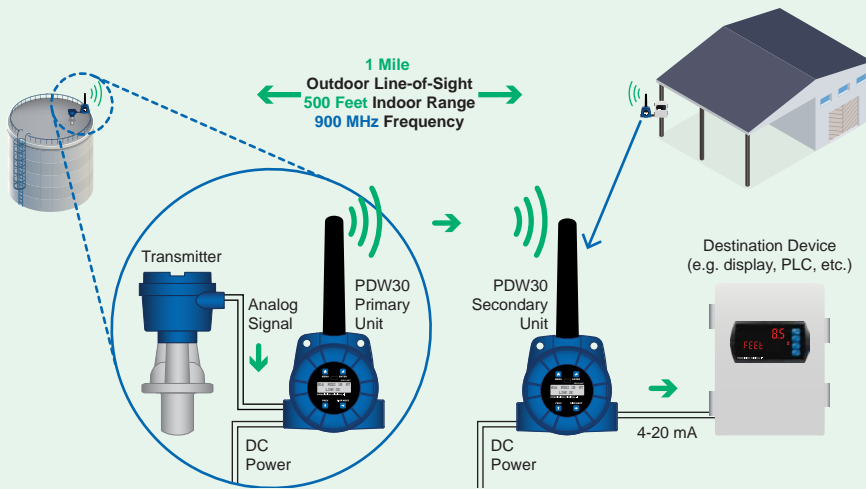
*Is it too expensive or inconvenient for you to run conduit for your 4-20 mA signals?*

## Make Your 4-20 Level Transmitter a Wireless Device

1. A level transmitter connected to the PDW30's primary unit, sends the transmitter's signal wirelessly to a secondary unit.
2. The secondary unit receives the signal and sends it to a digital panel meter in a control room.



### Point to Point Systems



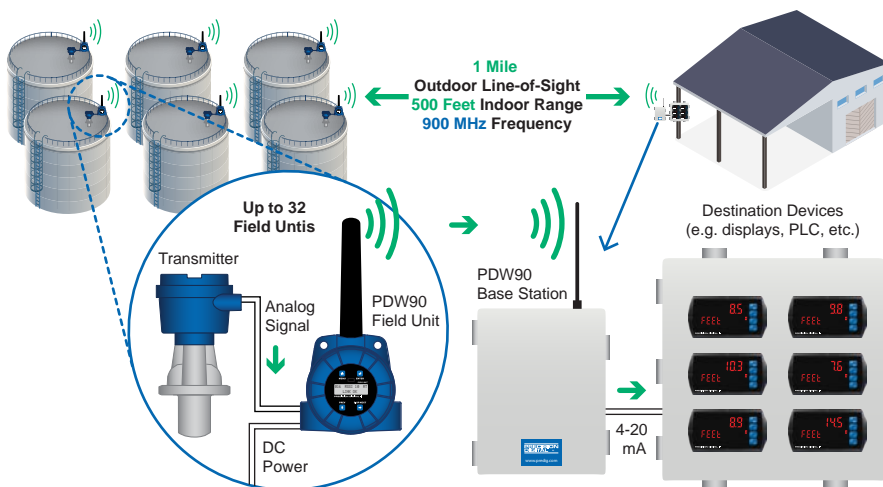
### A Simple Wire Replacement Solution

The PDW30 is plug and play ready out of the box to wirelessly bridge a 4-20 mA signal. In addition, the PDW30 can transmit 4 digital I/O signals and RS-485 Modbus RTU.

#### Products

PDW30

### Point to Multi-Point Systems



### Connecting Multiple Devices Wirelessly

Wireless remote monitoring of tank levels is a great application for the PDW90. Multiple transmitters are outputting 4-20 mA signals to wireless field units. The 4-20 mA signals are being wirelessly broadcasted to the PDW90 base station which sends 4-20 mA signals to the destination devices. System supports up to 32 field units.

#### Products

PDW90

## Filter Press Panels Upgrade

The Trident X2 1/8 DIN digital panel meter is a great replacement for older, hard to see digital panel meters on filter press consoles. The Trident X2 features a 1.2" (30.5 mm) display that is typically more than twice the size of older meters with displays of 0.56" (14.2 mm). The Trident is UL Listed and features a NEMA 4X front panel.

### Products

PD765 X2



## Digester Temp



The standard display size Trident meter is displaying sludge outlet temperature on Digester 10.

### Products

PD765, PD7000.

## Digester Level



A Loop Leader is displaying Digester level in engineering units as indicated by "Feet" on the display line 2. No additional power is required for meter.

### Products

PD6602, PD6603, PD6604.

## Pump Speed



The customer really appreciated being able to read the Trident X2's large display from much farther away than the previous meters.

### Products

PD765, PD6000, PD6602.

## Effluent Flow

Though the application did not require an explosion-proof meter, the customer chose the PD6820 for its rugged NEMA 4X/IP66 enclosure. The top line is displaying million gallons per day and the bottom line is displaying total gallons.

### Products

PD2-6200, PD6200, PD6624, PD6820.



## Upstream



### Extracting

The PD6830 mounts directly to the turbine flowmeter and provides local display of total flow and re-transmits a Modbus signal back to the central control station.

### Benefits

- Display Rate, Total & Grand Total
- On-Board Data Logging
- Modbus RS-485 Option
- All models Operate from -40 to 75°C
- Battery, DC, or Output Loop-Powered

### Products

PD6830

## Midstream



New Loop Leaders feature a dual-line display and bargraph and can flash red on alarm condition.

### Div 2 Compressor Panels

Precision Digital's older style Loop Leader loop-powered meters are installed on this Division 2 compressor panel.

### Products

PD6606, PD6608



## Downstream



### Refining

Two PD8-765 ProtEX-MAX meters are being used for dual pump alternation control at an oil refinery.

### Benefits

- Supplies 24 VDC to Power the Transmitter
- Big 1.2" Display Can be Seen from a Distance
- 2 Relays for Pump Control & Alternation
- Explosion-Proof Approved as Complete Product

### Products

PD8-765

## Explosion-Proof

### Worldwide Approvals

Our explosion-proof indicators and controllers carry all major approvals including FM, CSA, ATEX and IECEx for use in hazardous areas around the world. And unlike our competitors, our products are approved as a complete unit; not just a meter stuffed inside an exp-proof enclosure.



### Line or Loop-Powered Meters

To power the transmitter, go with line-powered meters like the one above. For meters to be powered entirely from the 4-20 mA loop, then choose loop-powered meters like the one below.



### SafeTouch Buttons

Through-glass buttons allow for convenient operation of the meter without removing the cover (and exposing the electronics) in a hazardous area.

#### Products

**Hazardous Area:** PD8 Series, PD6800 Series.

## Intrinsically Safe & Nonincendive



### Panel Mount

The Loop Leader Series is UL and C-UL Listed as intrinsically safe and nonincendive, and ATEX / IECEx Certified for intrinsic safety (gas atmospheres). These models are also UL and C-UL Listed for electrical safety and Type 4X front panel. All models are CE marked.

#### Products

**Hazardous Area:** PD6600 Series.



### Field Mount

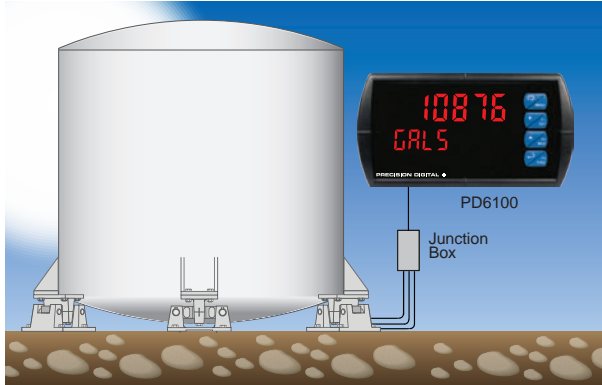
The PD685 is certified by CSA, ATEX and IECEx as intrinsically safe, suitable for use in gas and dust hazardous areas. The PD686 is FM Approved and CSA Certified as intrinsically safe and nonincendive. Both come in a NEMA 4X/IP66 enclosure with a 1/2" conduit hole.

#### Products

**Hazardous Area:** PD685, PD686.

**-40 to 65° / 75°C operation**

## Load Cells



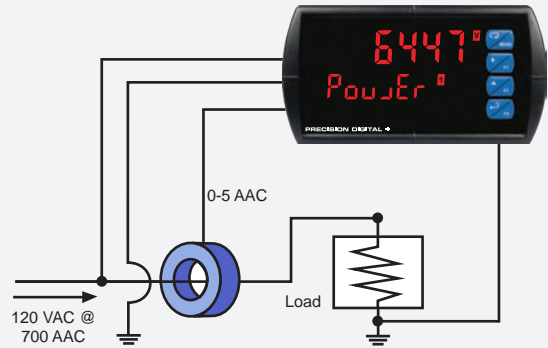
### Tank Weighing with Load Cells

The PD6100 receives a combined signal from a junction box connected to three load cells under each of the three tank legs. The weight of the empty tank and the full tank weight are programmed into the meter. Over time the zero feature accounts for obstacles like sludge buildup.

**Products**

PD2-6100, PD6100. **Hazardous Area:** PD8-6100.

## High Current & High Voltage



### Apparent Power Calculation

The PD6400 is ideal for measuring direct voltage and current or the output from voltage shunts and current transformers. Use it with a single voltage or current input, or to measure both simultaneously. A math channel calculates apparent power.

**Products**

PD2-6400, PD6400.

## Temperature



### Temperature Applications

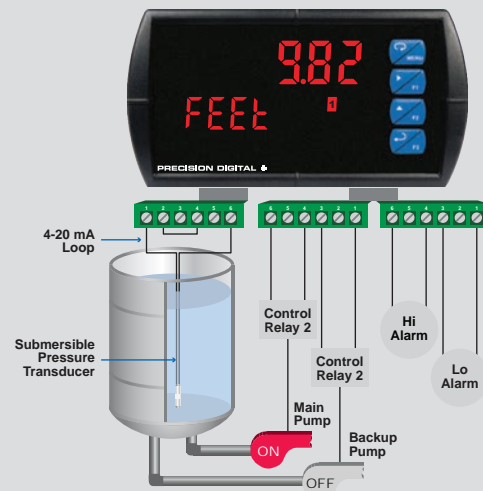
Bearing temperature monitoring, temperature indication, and temperature control with auto-tuning PID capabilities. Also available are temperature scanners, and meters that function as explosion-proof temperature transmitters.

**Products**

PD138, PD2-7000, PD743, PD765, PD7000.

**Hazardous Area:** PD8-765, PD8-7000.

## Pressure



### Level with Pressure Transducers

Combine a Precision Digital meter with a submersible pressure transducer for a great way to measure and control level in a tank, sump, well, lift station, etc. Our meters provide relays for alarm and control.

**Products**

PD2-6000, PD2-6001, PD2-6060, PD765, PD6000,

PD6001, PD6060. **Hazardous Area:** PD8-765,

PD8-6000, PD8-6001, PD8-6060.

## Displaying Outside Ammonia



### Gas Detection at Power Plant

A PD2-6000 displays the 4-20 mA output from a gas detector on a big display. Here, gas detection systems located in shelters throughout a power plant are used to monitor and display levels of ammonia (NH<sub>3</sub>) and CO<sub>2</sub>.

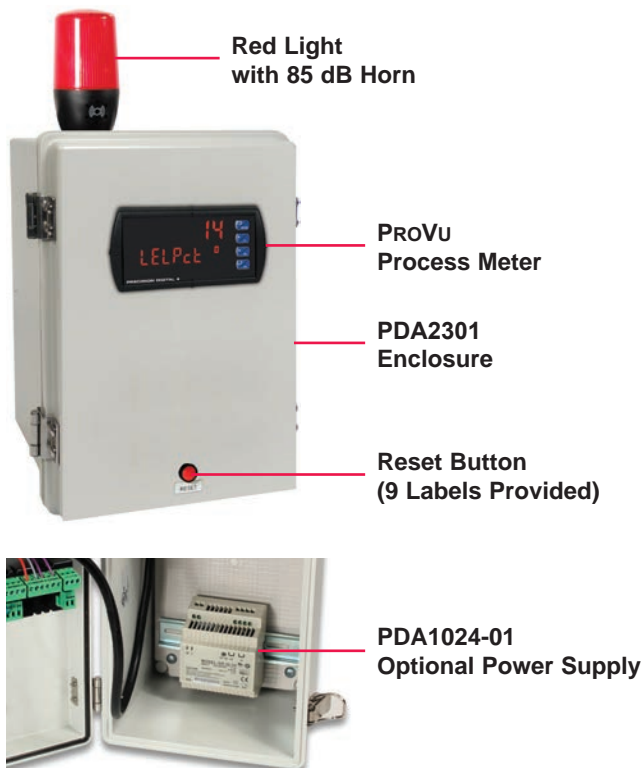
## Chlorine Leak Detection



### Gas Detection at Water Treatment Plant

Three PD765 Trident X2 displays are monitoring chlorine gas leaks from gas detectors located in various different areas throughout a water treatment plant.

## Display & Alarm System



### MOD-LH for Gas Detection

The PD6000-6R7 mounted in a PDA2301 enclosure with MOD-LHRB1 Light / Horn accessory makes a convenient display and alarm system for gas detection applications. For gas detectors that require more than the 200 mA power the PD6000 can provide, Precision Digital offers the PDA1024-01 1.5 A power supply.

### Operation

Input: 4-20 mA = 0-100 LEL

Relay	Purpose	Trip	Reset	Action
1	Red Light	20	15	Latch
2	Horn	20	15	Latch with Clear
3	High Alarm to a Central Control System	40	35	-
4	Fault Signal to a Central Control System	-5	0	-

Watch the Light / Horn Video [www.predig.com/light](http://www.predig.com/light)

# Application Enhancers

## NEMA 4 & 4X Enclosures



- House up to 10 meters
- Plastic, steel, and stainless steel
- Horizontal, vertical or no cutouts
- 1/8 DIN cutout(s) pre-cut

Need help choosing an enclosure?  
[predig.com/esu](http://predig.com/esu)



3D CAD files for enclosures available online.

## Light / Horn Accessories



Helios and Enclosures can be equipped with a Light / Horn and Reset Button for audible and visual ways to indicate alarms.

View light color options  
[predig.com/PDA-LH](http://predig.com/PDA-LH)

## Stainless Steel Tags



A laser etched stainless steel tag for equipment identification or instruction. Each tag comes with a stainless steel wire and lead seal for easy mounting.

Order stainless steel tags at  
[predig.com/PDA-SSTAG](http://predig.com/PDA-SSTAG)

## Free Programming Software

Most of our products offer free programming software for easy setup from a PC.

