

PD8-6200 Explosion-Proof Analog Input Flow Rate/Totalizer

Data Sheet



IECEEx



MeterView Pro

USB Install

- Fully Approved Explosion-Proof Analog Input Flow Rate/Totalizers
- 0-20 mA, 4-20 mA, 0-5 V, 1-5 V, and ± 10 V Inputs with $\pm 0.03\%$ Accuracy
- Dual-Line 6-Digit Display, 0.6" (15 mm) & 0.46" (12 mm)
- CapTouch Through-Glass Button Programming
- Display Mountable at 0°, 90°, 180°, & 270°
- Isolated 24 VDC @ 25 mA Transmitter Power Supply
- Easy Field Scaling in Engineering Units without Applying an Input
- 4 Relays with Interlocking Capability + Isolated 4-20 mA Output Option
- Free PC-Based, On-Board, MeterView Pro USB Programming Software
- SunBright Display Standard Feature; Great for Outdoor Applications
- Display Rate & Total at the Same Time
- Rate in Units per Second, Minute, Hour, or Day
- Total, Grand Total or Non-Resettable Grand Total
- Front Panel or Remote Total Reset
- Password Protection for Total Reset
- Total Stored in Non-Volatile Memory
- Assign Any Relay for Rate or Total
- 4-20 mA Output for Rate or Total
- Display Open Channel Flow with Programmable Exponent Feature
- 32-Point Linearization & Square Root Extraction
- Operating Temperature Range: -55 to 65°C (-67 to 149°F)
- CSA Certified as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof
- ATEX and IECEEx Certified as Dust-Ignition-Proof / Flame-Proof
- Input Power Options: 85-265 VAC / 90-265 VDC or 12-24 VDC / 12-24 VAC
- Programmable Display, Function Keys & Digital Inputs
- Flanges for Wall or Pipe Mounting
- Explosion-Proof Aluminum or Stainless Steel NEMA 4X / IP68 Enclosures
- On-Board RS-485 Serial Communications
- Modbus® RTU Communication Protocol Standard
- Password Protection
- Four 3/4" NPT Threaded Conduit Openings
- Stainless Steel Pipe Mounting Kit and Tag Available
- 3-Year Warranty

The Complete **ProtEXTM** Series MAX

SP Ex IECEx CE



PD8-154
**4-Point Alarm
Annunciator**



PD8-6100
Strain Gauge Meter



PD8-158
**8-Point Alarm
Annunciator**



PD8-6200
**Analog Input
Flow Rate/Totalizer**



PD8-765
**Process &
Temperature Meter**



PD8-6210
**Analog Input Batch
Controller**



PD8-6000
Process Meter



PD8-6262
**Analog Dual-Input
Flow Rate/Totalizer**



PD8-6001
**Feet & Inches
Level Meter**



PD8-6300
**Pulse Input
Flow Rate/Totalizer**



PD8-6060
**Dual-Input
Process Meter**



PD8-6310
**Pulse Input
Batch Controller**



PD8-6080
**Modbus® Scanner
with Dual Analog Input**



PD8-6363
**Pulse Dual-Input
Flow Rate/Totalizer**



PD8-6081
**Feet & Inches
Modbus® Scanner**



PD8-7000
Temperature Meter

Go to **PREDIG.COM** for details on the entire ProtEX-MAX Series Meters



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OVERVIEW

Front

SP

Ex

IECEx

CE

CAP TOUCH™

Through-Glass Button Programming

MeterView Pro

USB Installation

Mounting Flanges (Up to 2½" Pipe)

Locking Screw

CapTouch Menu Button

Rate, Total, Grand Total, etc.

Rate, Total, Grand Total, etc.

Overflow Indication

Indicates Bottom Line Is Showing Grand Total

CapTouch Right Arrow

Explosion-Proof NEMA 4X Enclosure
L: Aluminum, blue
R: Stainless Steel, silver

CapTouch Enter or Alarm Acknowledge Button

Large 0.6" Digits On Upper Display

Indicates Top Line Is Showing Rate

Programmable Function Keys

Alarm Status Indicators

CapTouch Display or Up Arrow

90° Rotatable Display

Sunlight Readable Display

NEMA 4X Enclosure

Connections

4-20 mA Output Powered by ProtEX-MAX

RELAY4 RELAY3 RELAY2 RELAY1 MA OUT

SIGNAL

ProtEX-MAX provides 24 VDC power to the transmitter

M-LINK connection from integrated electronics to ProtEX-MAX connector board.

RS-485 Connections

DI \overline{DI} \overline{DO} DO

Digital I/O Connections

Connections for PD8-6200-6H7 & PD8-6200-7H7

- Form C (SPDT) relays
- Two isolated supplies available even on 12/24 VDC input power models
- Removable terminal blocks
- 4 relays + isolated 4-20 mA output option
- Universal 85-265 VAC or 12/24 VDC input power
- Voltage or current inputs
- No jumpers needed for
- V/mA input selection
- Digital input (F4)

The Only Explosion-Proof Flow Rate/Totalizer You Will Ever Need

The ProtEX-MAX PD8-6200 explosion-proof flow rate/totalizers are specifically designed for displaying flow rate and total from flowmeters with analog outputs. The meter boasts specifications, features and functionality that make it the only hazardous area flow rate/totalizer you will ever need.

The PD8-6200 has all the same features as our PD6200 1/8 DIN process meter, is certified by CSA as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof and by ATEX and IECEx as Dust-Ignition-Proof / Flame-Proof. Besides being suitable for hazardous areas, the number one feature that makes the PD8-6200 such a useful device is its built in 24 VDC power supply to drive the transmitter as illustrated by the above diagram. This feature not only saves the cost of an external power supply, but also greatly simplifies wiring. In addition, there is a second 24 VDC @ 25 mA power supply provided with the 4 20 mA output option.

The first thing you notice about the PD8-6200 is its modern looking, rugged, explosion-proof housing with convenient

mounting flanges, available in aluminum or stainless steel. Housed inside this enclosure is a dual line, 6 digit display with high intensity LEDs that can be read in direct sunlight. The main display can be programmed to display flow rate, total, or grand total, and the second display can be programmed to display flow rate, total, grand total, engineering units, custom legends, or turned off.

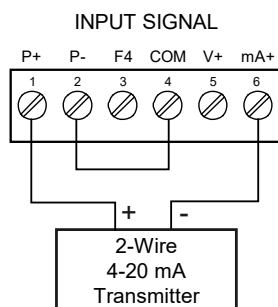
ProtEX-MAX flow rate/totalizers can be programmed for a wide variety of totalizer applications. They can display total, grand total, or non-resettable grand total with a time base of seconds, minutes, hours or days. The user can program a totalizer conversion factor, a non-resettable grand total, password protection, and several total reset methods. Finally, all these features and capabilities can easily be programmed without removing the cover using CapTouch buttons in a hazardous area or with free MeterView Pro PC based software in a safe area.

TRANSMITTER POWER SUPPLIES

Meter Powers Transmitter

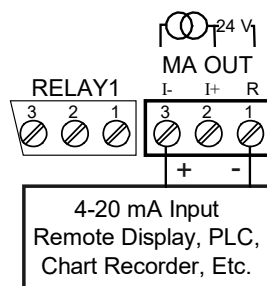
One of the most useful standard features of the PD8-6200 is its built-in isolated, 24 V @ 25 mA power supply to power the transmitter. This feature saves money by eliminating an external power supply and also simplifies wiring by reducing the number of devices in the loop. It can be configured for 5, 10, or 24 V (default) by means of a simple internal jumper. This power supply is even available on meters that are powered from DC power (24 V @ 25 mA). To use an external power supply instead of the internal power supply, simply make connections to different terminals on the ProtEX-MAX.

The following diagram illustrates how to wire the ProtEX-MAX so it will power the transmitter:



Meter Powers 4-20 mA Output

Not only can the ProtEX-MAX power the 4-20 mA input signal, but an additional power supply of 24 V @ 25 mA is provided with the 4-20 mA output option to power the 4-20 mA output.



Fuse Prevents Current Overload

Another very useful aspect of the ProtEX-MAX is that the current input is protected against current overload by a resettable fuse. The fuse limits the current to a safe level when it detects a fault condition, and automatically resets itself when the fault condition is removed.



ADVANCED DISPLAY FEATURES

Display Flow Rate, Total or Grand Total

The main display can be programmed to display flow rate, total, or grand total, and the second display can be programmed to display flow rate, total, grand total, engineering units, custom legends, or can be turned off. Both displays could also display relay set points, or max and min values. The following images show typical ways these flow rate/totalizers can be programmed.



Flow Rate Indicator



Flow Totalizer



Rate & Total



Total & Grand Total

Easy to Use

The user-friendly dual-line display makes the PROVu easy to set up & program. No jumpers to set for input selection. All setup & programming is done via the front panel.



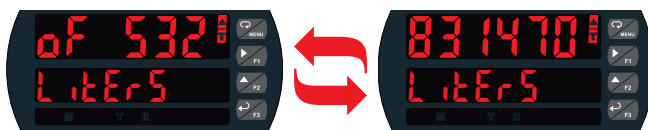
Input Setup



Display Setup

Totalizer Overflow Displays Total to 9 Digits

These flow rate/totalizers can display up to nine digits of total flow with the total overflow feature. In the diagram below, the flow totalizer is displaying 532,831,470 by toggling between a display of "oF 532" and "831470". Notice the (T▲) symbol is lit up indicating the display is in overflow mode.



Super-Bright Display

The ProtEX-MAX comes standard with a super-bright display, with LEDs that are visible even in direct sunlight. The display also has up to eight levels of adjustable intensity for optimum visibility in any lighting condition.

Rounding for Even Steadier Display

The rounding feature is used to give the user a steadier display with fluctuating signals. It causes the display to round to the nearest value according to the rounding value selected (1, 2, 5, 10, 20, 50, or 100). For example, with a rounding value of 10, and an input of 12346, the display would indicate 12350.

RATE/TOTALIZER FEATURES

ProtEX-MAX flow rate/totalizers can be programmed for a wide variety of rate and totalizer applications. They can display rate, total, grand total, or a non-resettable grand total with a time base of seconds, minutes, hours or days. The user can program a totalizer conversion factor, a non-resettable grand total, password protection, and several total reset methods. The dual-line display can be programmed to display rate and total at the same time, or a variety of other rate, total and grand total combinations.

Display Rate & Total at Same Time

One of the most useful features of the ProtEX-MAX flow rate/totalizers is their ability to display both flow rate and total at the same time. Whereas a single-line display would have to toggle between the rate and the total, the ProtEX-MAX's dual-line display can display them both at the same time.



Totalizer Password Protection

The total and grand total can be password protected so they can be reset only by authorized personnel.



Total Password



Grand Total Password

Non-Resettable Grand Total

The user can set up the grand total to be non-resettable by entering a specific password. Once this is done, the grand total can never be reset.

Totalizer Conversion Factor

The user can enter a totalizer conversion factor that allows the meter to display total in different units than the rate. For instance, a customer could measure flow rate in gallons per minute and total in hundredths of acre-feet.

Rate in Units Per Sec, Min, Hr, or Day

The user may select a rate time base in units per second, minute, hour, or day. The time base is the amount of time over which the rate parameter will totalize. For example, if the rate was ten (and stayed constant for one minute) and the time base was in minutes, then the total would increase by ten every one minute.

Total & Rate Alarms

The ProtEX-MAX can be equipped with four alarms (relays) that can be set up to activate on the rate or total. In the case of the rate, the relays can be programmed to trip on a high or low rate. In the case of the total, the relays can be programmed to trip when the total reaches a user-defined set point. A variety of reset modes are available and the user can also program time delays and fail-safe operation.

4-20 mA Output for Rate or Total

The 4-20 mA output can be assigned to the rate or total.

Total Stored in Non-Volatile Memory

Total and Grand Total values, and all programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.

Sampling Function (PV Triggered Timed Relay)

The sampling function allows the operator to program a set point for a "sampling" relay. When the process (rate or total) reaches that set point, it will close that relay's contacts for a preset period of time (0.1 to 5999.9 seconds). An example of its use may be for wastewater sampling. When the wastewater total reaches a preset total interval (i.e. every 10,000 gallons), the relay contacts would close for a preset time, and by some means (light, horn, etc.) alert someone to take a sample, or provide the trigger to automatically take a sample of the wastewater.

The utility of this function can, of course, be expanded beyond sampling and be used whenever a timed relay output closure is required when the rate or a total interval reaches a certain set point.

TOTAL RESET CAPABILITIES

The user may reset the total via a CapTouch button, the F4 terminal at the back of the meter, an external contact closure on the digital inputs, automatically via user selectable preset value and time delay, or through serial communications.

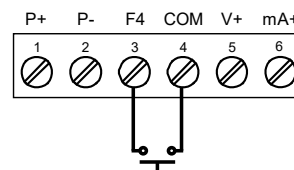
Total Reset via CapTouch Button

The three through-glass CapTouch button function keys can be programmed to reset the total and grand total. This makes it possible for the user to reset either the total or the grand total without opening the enclosure cover and without the need for external devices. Of course, if the total or grand total is password protected, they will not reset when the function key is pressed.



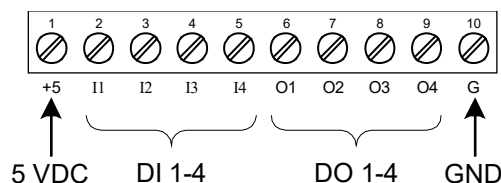
Total Reset via F4 Terminal

The PD8-6200 includes a digital input (referred to as the F4 terminal) located on the back of the electronics module as standard that can be used to reset the total or grand total, among other things. This is the preferred method for externally resetting the total or grand total because it does not interfere with the operation of the CapTouch buttons for programming as described below in the Total Reset via Digital Input section.



Total Reset via Digital Input

In addition to the F4 digital input described above, the PD8-6200 also includes four digital inputs that can be used to reset the total or grand total. However, if a digital input is used to reset the total, or for some other purpose, the corresponding through-glass CapTouch button will function as a programming key.



Total Reset via Preset Value

The total and grand total can be programmed for automatic or manual reset based on a preset value determined by the user. In the automatic reset mode, a programmable time delay is available to reset the total or grand total after the assigned preset is reached.

Total Reset via Serial Communications

The total and grand total can be reset via serial communications such as a Modbus command.

CAPTUCH THROUGH-GLASS BUTTONS

The ProtEX-MAX is equipped with four capacitive sensors that operate as through-glass buttons so that they can be operated without removing the cover (and exposing the electronics) in a hazardous area or harsh environment. CapTouch buttons are designed to protect against false triggering and can be disabled for security by selecting DISABLE on the switch labeled NO-CONTACT BUTTONS located on the connector board.

CapTouch Buttons

To actuate a button, press one finger to the window directly over the marked button area. When the cover is removed or replaced, the CapTouch buttons can be used after the meter completes a self-calibrating routine. The sensors are disabled when more than one button is pressed, and they will automatically re-enable after a few seconds. When the cover is removed, the four mechanical buttons located on the right of the faceplate are used.

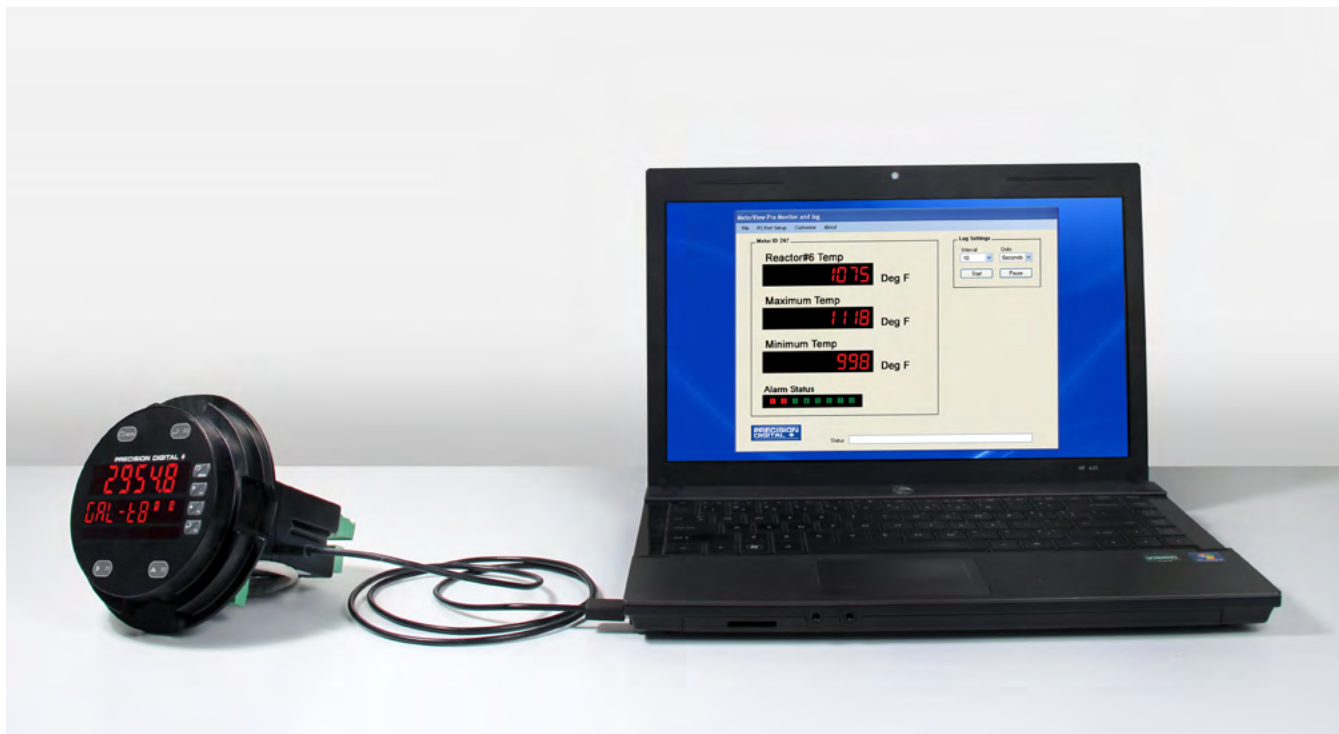
The CapTouch Buttons are configured by default to duplicate the function of the front panel mechanical pushbuttons associated with the integrated meter.



QUICK & EASY SCALE & PROGRAMMING METHODS

The ProtEX-MAX can be programmed either via the front panel push buttons or free, PC-based MeterView Pro software. MeterView Pro is resident on the ProtEX-MAX and is accessed by a provided USB cable, so it is by far the easiest way to program the ProtEX-MAX. The ProtEX-MAX can be calibrated either by applying a known signal or scaled by entering a desired value with the front panel buttons or MeterView Pro software. Most customers will use the scaling method because it is simpler and does not require a calibrated signal source. Selecting the input to be current or voltage is done with the front panel buttons or MeterView Pro software. Once programming is completed it can be locked with a password.

Free PC-Based MeterView Pro USB Programming Software & Cable



The ProtEX-MAX comes preloaded with free MeterView Pro programming software that connects and installs directly to your PC with a standard USB cable, also provided free with each instrument. This eliminates the need to insert CDs, install drivers, or download software from the internet. When you connect your ProtEX-MAX to your PC, MeterView Pro is downloaded to your PC, the software automatically selects the model you are programming, and you're ready to start programming immediately. Further simplifying the programming

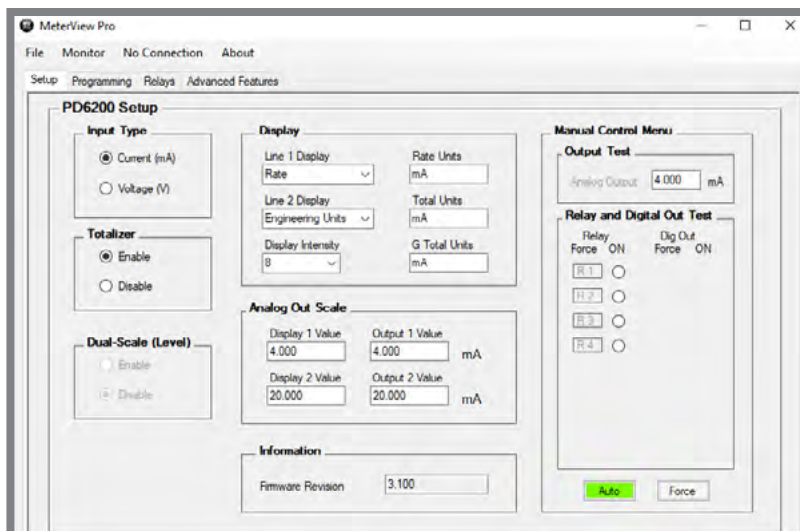
process, the ProtEX-MAX can be powered from the USB port, so no need to apply external power while programming your meter. In addition to programming, the software will also allow you to monitor, and datalog a ProtEX-MAX using your PC. You can also generate and save programming files for later use.



Click here to watch the
MeterView Pro video

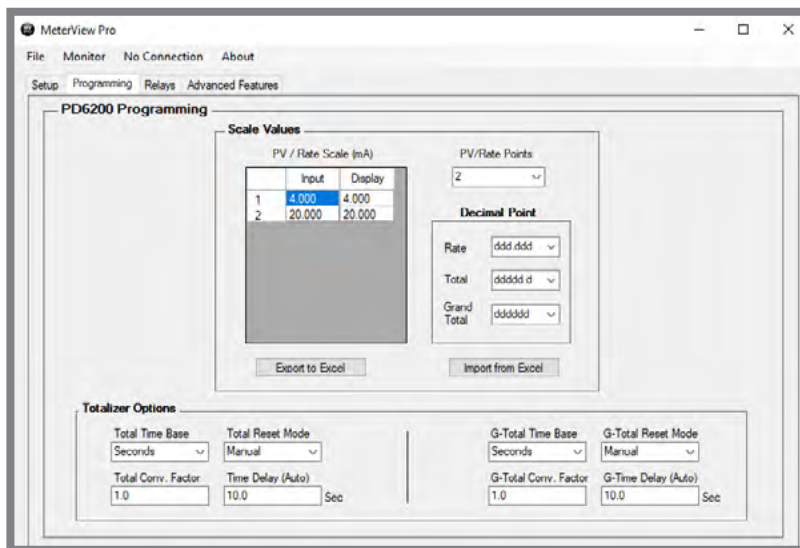
Setup Screen

- Select Voltage or Current Input
- Enable Totalizer Function
- Enable Dual-Scale Function
- Set Line 1 Display Parameters
- Set Line 2 Display Parameters
- Set Grand Total Units
- Set Analog Output Values
- Enable Manual Control
- Test Relays & Digital Outputs



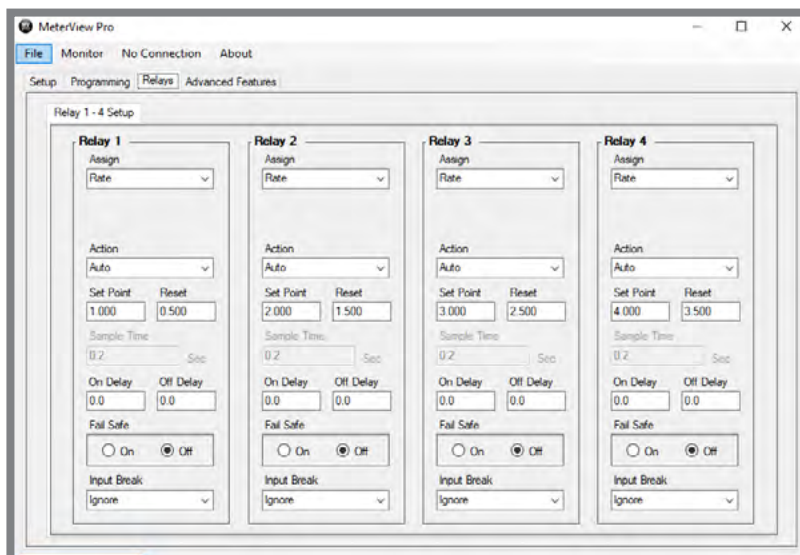
Programming Screen

- Set Scale Values
- Set the Number of Points (up to 32)
- Select Decimal Point
- Import from Excel
- Export to Excel
- Set Total Parameters
- Set Grand Total Parameters



Relays Screen

- Greatly Simplifies Programming a Variety of Relay Features
- Set Relay Action
- Set Sampling Time
- Set Set & Reset Points
- Set On/Off Time Delays
- Set Fail Safe Operation
- Set Input Break Relay Action



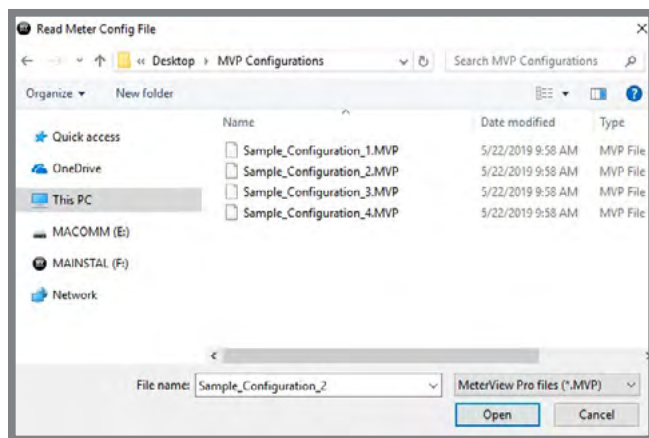
Save/Open Configuration

At the bottom of most MeterView screens are two tabs:

1. **Get Meter Data:** This reads the programming of the meter that is currently connected to the PC.
2. **Send Meter Data:** Clicking this button, sends current MeterView programming to the meter.



The configuration file can be sent or retrieved from the directory of your choice. This makes it very easy to program multiple meters with the same programming. It is also a great backup utility as well.



Specifications

System Requirements:

Microsoft® Windows® XP/Vista/7/8/10

Communications:

Onboard USB (firmware version 4.0 or higher),
RS-232 Adapter or RS-485 Adapter

Meter Address: 1 - 247

Reports:

- Data logging: Save as CSV file format
- Configuration: Save as PDC file format or print configuration

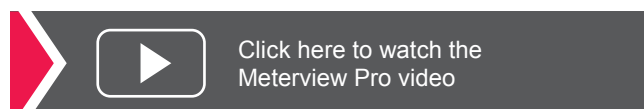
Baud Rate: 300 - 19,200 bps

Configuration: One meter at a time

Protocol:

Modbus RTU (requires firmware version 4.0 or higher)

**Note: Windows® 32/64-bit operating systems*



Password Protection

The Password menu is used for programming three levels of security to prevent unauthorized changes to the programmed parameter settings:

Pass 1: Allows use of function keys and digital inputs

Pass 2: Allows use of function keys, digital inputs and editing set/reset points

Pass 3: Restricts all programming, function keys, and digital inputs

4-20 mA OUTPUT & RELAYS

4-20 mA Analog Output

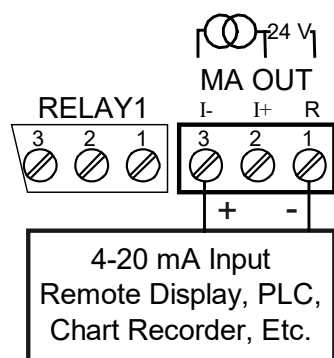
The isolated analog retransmission signal can be configured to represent rate/process, total, grand total, max, min, set points 1-4, or manual control mode. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA.

The 4-20 mA output can be reversed scaled such that 4 mA represents the high value and 20 mA represents the low value. For instance, a 4-20 mA output signal could be generated as the meter went from 100.0 to 0.0.

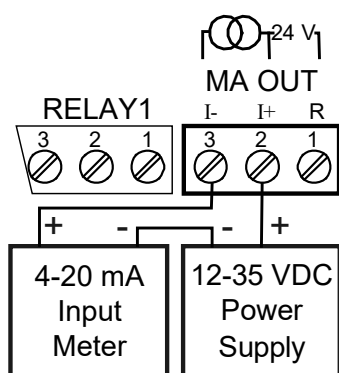
For applications where the input was linearized by the ProtEX-MAX, the 4-20 mA output will represent that linearized value.

Connections

The ProtEX-MAX can provide 25 mA at 24 VDC to power the 4-20 mA output signal or an external power supply can be used:



4-20 mA Output Powered by PD8-6200

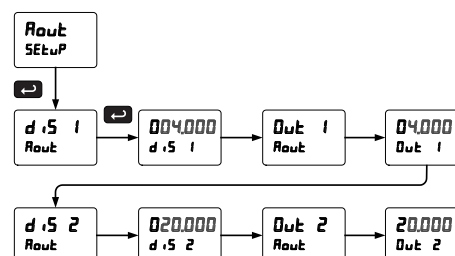


4-20 mA Output Powered by External Power Supply

The 4-20 mA output can either be programmed in a safe area using the front panel push buttons or free MeterView Pro software, or in a hazardous area without removing the cover using the CapTouch through-glass buttons.

Front Panel Push Button Programming

The 4-20 mA analog output can be scaled to provide a 4-20 mA signal for any display range selected. No equipment is needed to scale the analog output; simply program the display values to the corresponding mA output signal. The Analog Output menu is used to program the 4-20 mA output based on display values.



MeterView Pro Software Programming

When a meter is programmed as shown below, the output will be 4.00 mA when the display reads 0 and the output will be 20.00 mA when the display reads 150000.

Analog Out Scale	
Display 1 Value	Output 1 Value
0	4.000 mA
Display 2 Value	Output 2 Value
150000	20.000 mA

The meter can be set up for reverse scaling as shown below: the output will be 4.00 mA when the display reads 150000 and the output will be 20.00 mA when the display reads 0.

Analog Out Scale	
Display 1 Value	Output 1 Value
150000	4.000 mA
Display 2 Value	Output 2 Value
0.00	20.000 mA

Analog Out Control	
Source	
Rate	
Break	<input checked="" type="checkbox"/> 1.000
O-Range	21.000
U-Range	3.000
Max Output	23.000
Min Output	1.000

Source: Source for generating the 4-20 mA output (e.g. rate)

Overrange: Analog output value with display in overrange condition

Underrange: Analog output value with display in underrange condition

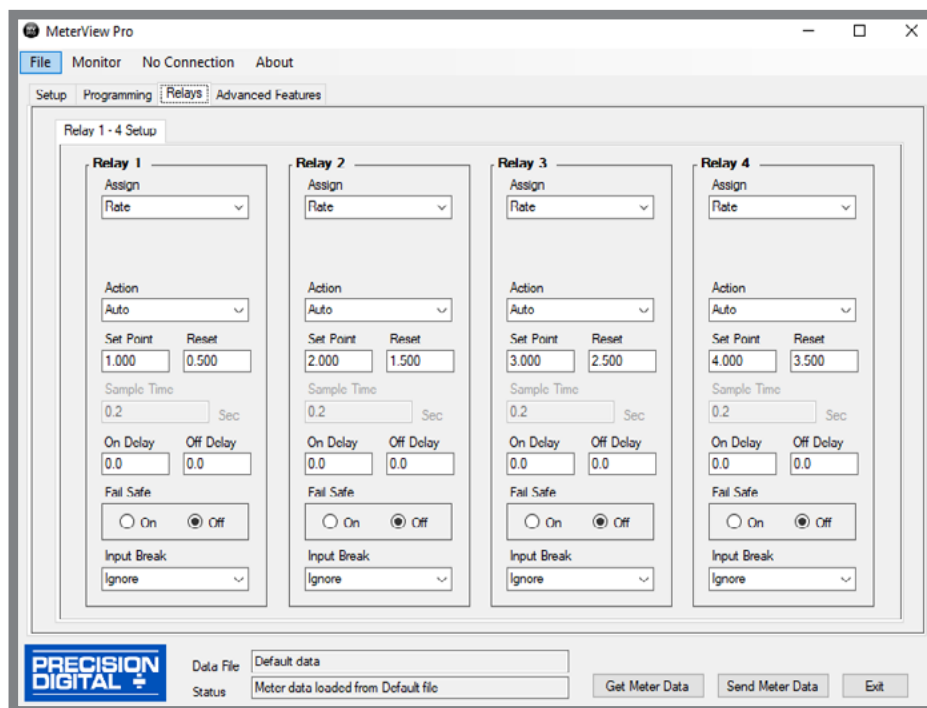
Break: Analog output value when loop break is detected

Max: Maximum analog output value allowed regardless of input

Min: Minimum analog output value allowed regardless of input

Relays for Hazardous Area Alarm & Control Applications

Adding relays to the ProtEX-MAX meter turns it into a sophisticated explosion-proof alarm device as well as a powerful, yet simple, alternative to a more complicated PLC system for control applications. One such application would be pump control using the ProtEX-MAX's relays in pump alternation mode. The ProtEX-MAX can be equipped with up to four 3 A Form C (SPDT) relays that can all be programmed to alternate, thus creating an explosion-proof pump alternator. Relays are highly user-configurable as the following screen shot from MeterView Pro indicates:



*Values are intended to show programming choices. They are not intended to represent an actual application.

Setting Set and Reset Points (HI / LO Alarms)

All relays are independent of each other and may be programmed as high or low alarms with user desired set and reset points. Setting a set point above a reset point results in a high alarm and setting a set point below a reset point results in a low alarm. Alarms have 0 – 100% deadband and set and reset points may be set anywhere in the range of the meter.

Resetting the Relays (Action in MV Pro)

All relays are independent of each other and may be programmed to reset (*Action* in MV Pro) in the following ways:

- **Automatic:** Alarm will reset automatically once the alarm condition has cleared.
- **Automatic/Manual:** Alarm will reset automatically once the alarm condition has cleared but can also be reset using the F3 front panel button* at any time.
- **Latching:** Alarm must be reset manually and can be done so at any time. Press the F3 front panel button* at any time to clear the alarm.
- **Latching with Reset after Cleared:** Alarm must be reset manually and can only be done so after the alarm condition has cleared. Press the F3 front panel button* after the alarm condition has cleared to reset the alarm.

* Or by connecting an external switch to F4 terminal or with an optional digital input.

Time Delay (On and Off)

In many applications it is desirable to wait before turning off or on a relay – such as waiting for a process to settle before taking action. Each relay on the ProtEX-MAX can be programmed with independent on and off time delays of 0 to 999.9 seconds to achieve this.

Relays Auto Initialization

When power is applied to the meter, the front panel LEDs and alarm relays will reflect the state of the input to the meter.

Signal Loss or Loop Break Relay Operation

When the meter detects a break in the 4-20 mA loop, the relay will go to one of the following selected actions:

1. Turn On (Go to alarm condition)
2. Turn Off (Go to non-alarm condition)
3. Ignore (Processed as a low signal condition)

User Selectable Fail-Safe Operation

All relays are independent of each other and may be programmed for user selectable fail-safe operation. With the fail-safe feature activated, the relays will transfer to the alarm state on power loss to the meter.

Front Panel LEDs

The meter is supplied with four alarm points that include front panel LEDs to indicate alarm conditions. This standard feature is particularly useful for alarm applications that require visual-only indication.

Manual Output Control

Take control of any output with this feature. All relays can be forced ON or OFF, and the 4-20 mA output signal can be set to any value within its range. When the relays and 4-20 mA output are controlled manually, an LED labeled “M” is turned on and the associated Alarm LEDs (1-4) flash every 10 seconds indicating that the meter is in manual control mode.

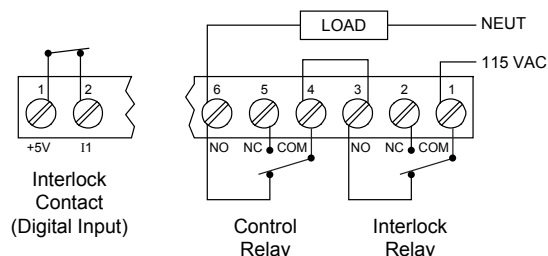


Sampling Function (PV Triggered Timed Relay)

The sampling function allows the operator to set a relay as a “sampling” relay. When the PV reaches that set point, it will close that relay’s contacts for a preset period of time (0.1 to 5999.9 seconds). An example of its use may be for beer/ale fermentation. When the batch reaches a certain pH, the relay contacts would close and by some means (light, horn, etc.) alert someone to take a sample, or provide the trigger to automatically take a sample of the batch. The utility of this function can, of course, be expanded beyond sampling and be used whenever a timed relay output closure is required when the PV reaches a certain set point.

Interlock Relay(s)

This function allows a process to use one or more very low voltage input signals or simple switch contacts to control the state of one or more internal “interlock” relays. A violation (i.e. loss of input, open switch, or open circuit) forces one or more N/O interlock relay contacts to open. One input can be used in series with a number of interlock switches, or up to eight inputs can be required to force-on one (or more) internal interlock relays. Please see *Safety Interlock on the ProVu Series* whitepaper on our website for more information.



Switching Inductive Loads

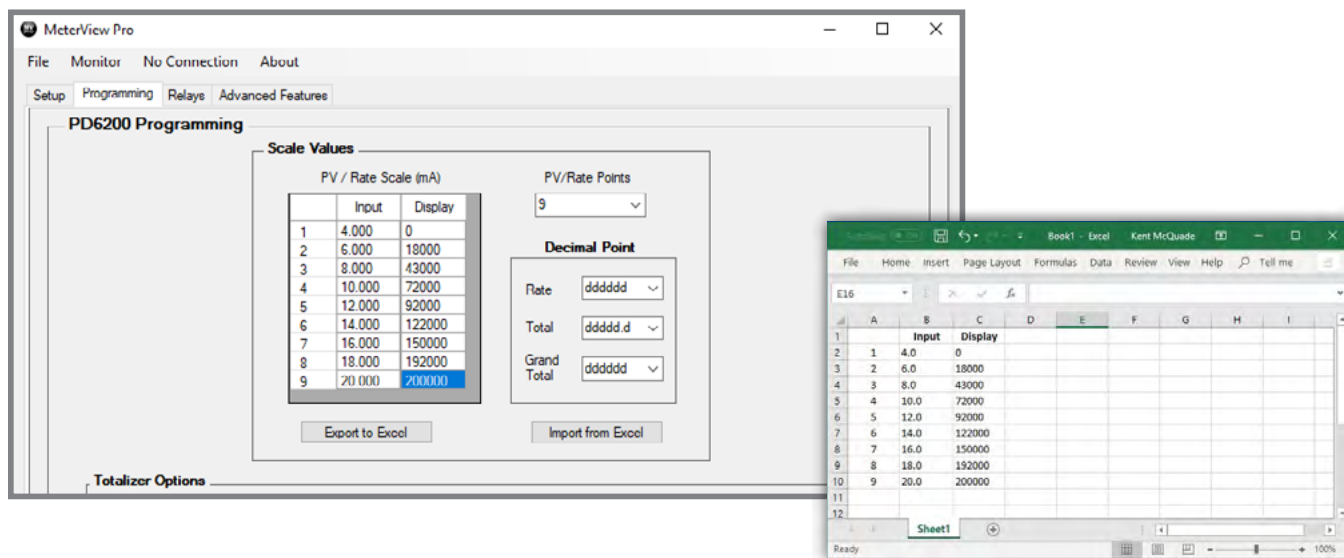
The use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor’s operation. The suppressors also prolong the life of the relay contacts. Precision Digital offers the PDX6901.

INPUT SIGNAL CONDITIONING

There are many applications in the industrial world that can't be satisfied with simple, two-point linear scaling so the ProtEX-MAX has advanced linearization capabilities to handle applications like round horizontal tank volume measurement, open channel flow, DP flow, and others. And all of these capabilities are easily programmed using MeterView Pro programming software.

32-Point Linearization

The most common way to linearize a non-linear signal is to break it up into smaller ranges that are more linear than the overall range. The ProtEX-MAX is available with up to 32 points of linearization and if the dual scale feature is used with the totalizer disabled, the second PV/Rate scale can have up to eight points of linearization. The linearization data can be imported from an Excel spreadsheet or can be exported from MeterView Pro to an Excel spreadsheet. The following screen shot from MeterView Pro shows the PV/Rate Scale with 9 points of linearization:



Scale values can also be imported from an Excel spreadsheet.

Specialized Linearization Functions

In addition to the generic 32- and 8-point linearization functions, the ProtEX-MAX is also available with specialized functions for round horizontal tanks, open channel flow, and DP flow.

Round Horizontal Tank

Function

Signal Input Conditioning
RHT

Diameter 48.000 Inch

Length 120.000

The user enters the diameter and length of a flat-ended round horizontal tank resulting in a display of volume.

Programmable Exponent

Function

Signal Input Conditioning
Prog Exponent

Exponent 1.683

The input is raised to an exponent programmable by the user resulting in a display of open channel flow rate.

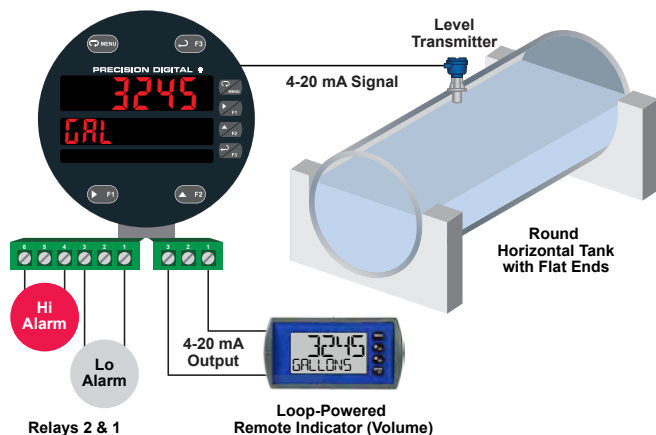
Square Root Extraction

Function

Signal Input Conditioning
Square Root

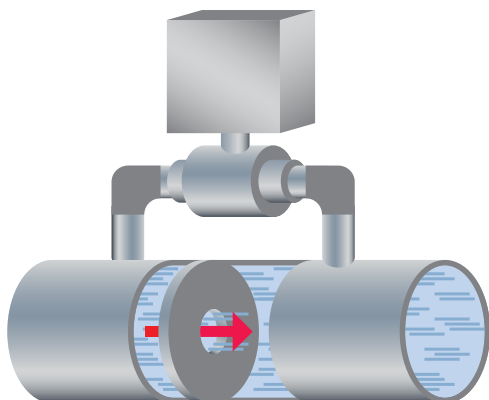
The square root of the input is taken resulting in a display of flow rate.

Round Horizontal Tank Volume Linearizer



In this application, a level sensor is measuring the height in the round horizontal tank and the ProtEX-MAX is converting that signal to volume using the RHT function. All the user has to do is input the diameter and length of the tank and the meter converts the signal to volume.

DP Flow via Square Root Extraction

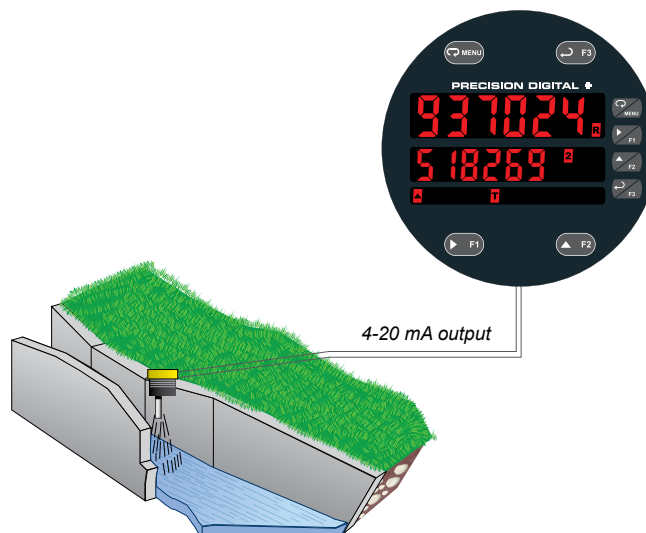


In this application, the PD8-6200 is displaying flow rate by extracting the square root from the 4-20 mA signal from a differential pressure transmitter. The user selectable low-flow cutoff feature gives a reading of zero when the flow rate drops below a user selectable value.

Linear 4-20 mA Analog Output

For applications where the input was linearized by the ProtEX-MAX, the 4-20 mA output will represent that linearized value.

Open Channel Flow Rate Indication



In this application, a level sensor is measuring the height in a weir and the ProtEX-MAX is converting that signal to flow rate using the programmable exponent function. All the user has to do is input the corresponding exponent for their weir and the meter will convert the signal to flow.

The following information is required for programming the PD8-6200 for open channel flow rate:

1. The exponent value associated with the flow calculation for the specific weir or flume being used.
2. The zero head, or water depth, mA value from the level transmitter.
3. The mA value from the transmitter for the maximum head, and the flow rate at that level. The level transmitter is normally programmed to provide 20 mA at the maximum head value and flow rate.

Example:

A 120° V-notch weir flow formula for millions of gallons per day is shown below.

$$MGD = 2.798 H^{2.5}$$

The exponent component is 2.5.

The level transmitter has been programmed so that at zero head, when the water level is at the base of the V-notch, the output is 4 mA.

The level transmitter has been programmed so that at the top of the V-notch, at 2.00 ft, the output is 20 mA.¹

The coefficient of the flow equation (2.798 in the above example), is not needed for programming the meter; the scaling function of the meter incorporates the coefficient and the head height automatically.

1. *Isco Open Channel Flow Measurement Handbook, Sixth Edition*, ed. Diane K. Walkowiak, M.A. (Teledyne Isco, Inc., 2006), 168-169.

DIGITAL COMMUNICATIONS

Modbus® RTU Serial Communications

With onboard RS-485 serial communication, the PD8-6200 can communicate with any Modbus *master* device using the popular Modbus communications protocol that is included in every ProtEX-MAX. In addition to the typical Modbus capabilities of reading PVs and writing set points, below are some examples of other things that can be done with the meter's Modbus communications:

- Send a 6-character message to the lower display upon an event
- Convert a digital value to a 4-20 mA signal
- Remote user control (i.e. change set points, acknowledge alarms)
- Input a Modbus digital PV (in place of analog input)
- Remote override of any or all relays and analog outputs



Modbus PV Input



Remote Message



Click here for more information on the ProVU's Modbus capabilities

Serial Adapters & Converters*



PDA7485-I
RS-232 to RS-422/485
Isolated Converter



PDA8485-I
USB to
RS-422/485
Isolated Converter



For more
info on serial
converters
click here.

*All adapters and connectors supplied with appropriate cables.

Integrated Digital I/O and Serial Communications



Digital I/O Connections

Four digital inputs and four digital outputs come standard with the ProtEX-MAX. External digital inputs can function similarly to the front panel function keys or digital input F4. They can be configured to trigger certain events (i.e. acknowledge/reset alarms, reset max and/or min values, disable/enable all output relays, and hold current relay states), or provide a direct menu access point. The inputs can be connected to a multi-button control station to provide the user with remote control of the four front panel push buttons.

Digital outputs can be used to remotely monitor the ProtEX-MAX's alarm relay output states, or the states of a variety of actions and functions executed by the meter.

Note: The onboard digital inputs (1-4) are configured at the factory to function identically to the front panel pushbuttons (Menu, F1, F2, & F3) in order to work with the CapTouch buttons. Changing the programming of the digital inputs will affect the function of the CapTouch buttons.



Serial Communications Connections

ProtEX-MAX meters come with an RS-485 connection for serial communications with other digital devices. The industry standard Modbus RTU protocol is included with every meter.

PHYSICAL FEATURES

The ProtEX-MAX is designed for ease-of-use in safe and hazardous area applications, and is housed in a rugged NEMA 4X explosion-proof enclosure, available in either aluminum or stainless steel. The PD8-6200 can operate over a wide temperature range (-55 to 65°C / -67 to 149°F), includes removable screw terminal connectors, can have up to four relays and a 4-20 mA output, and features through-glass buttons for easy meter operation without the need to remove the cover. All of these features are backed by a 3-year warranty.

Super-Bright LED Display

The ProtEX-MAX features a dual-line 6-digit display with super-bright LEDs, our brightest ever. These allow the display to be read in any lighting condition, even in direct sunlight.



CapTouch Through-Glass Buttons

The ProtEX-MAX is equipped with four capacitive sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover (and exposing the electronics) in a hazardous area. These buttons can be disabled for security by selecting the DISABLE setting on the NO-CONTACT BUTTONS switch located on the back of the electronics module, inside the enclosure.

Rugged Explosion-Proof Enclosure

The ProtEX-MAX is housed in a rugged NEMA 4X, 7, & 9, IP68 aluminum or stainless steel enclosure, designed to withstand harsh environments in safe and hazardous areas.



Wide Viewing Angle

Customers can't always look at the display from straight on, so the window and display module have been optimized to provide a wide viewing angle of approximately $\pm 40^\circ$; nearly twice that of the competition.



Built-In Mounting Flanges

The ProtEX-MAX is equipped with two slotted flanges for wall mounting or NPS 1½" to 2½" or DN 40 to 65 mm pipe mounting.



Flexible Mounting & Wiring

The ProtEX-MAX features four ¾" NPT threaded conduit openings are available so that wiring can be routed to the most convenient conduit connection(s).



Rotatable Display

The ProtEX-MAX rotatable display, along with four available conduit connections, provide for numerous installation options. The display can be rotated in 90° increments. Rotate it 90° for horizontal mounting.



Vertical Mounting



Horizontal Mounting

Perfect & Secure Fit Every Time

The internal cast rails ensure the ProtEX-MAX assemblies together perfectly, quickly and securely; and everything lines up for optimal viewing every time. There are no standoffs to worry about breaking or getting out of alignment. The display module snaps into the built-in rails on the enclosure making assembly a snap, while pressing the display as close to the glass as possible to improve wide angle viewing. No tools are needed to install or remove it.

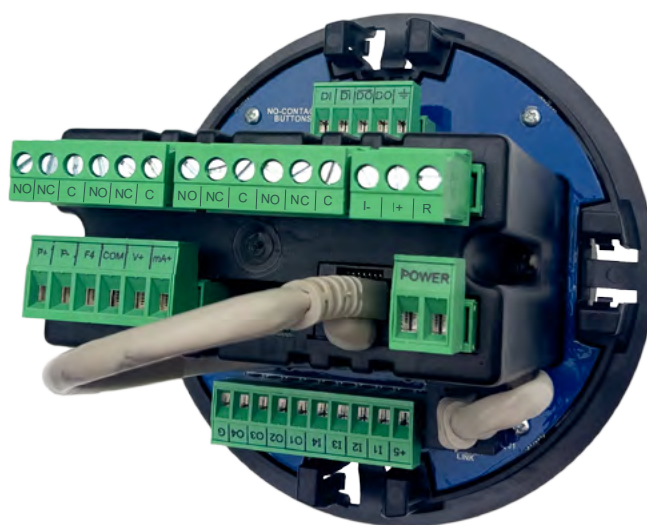
PDA-SSTAG Stainless Steel Tags

PDA-SSTAG is a laser etched stainless steel tag accessory for any Precision Digital meter. The tag features custom text for equipment identification, instruction, or whatever else is needed in your facility. Each tag comes with a stainless steel wire and lead seal for easy mounting wherever you need it.



Removable Screw Terminal Connectors

Industrial applications require screw terminal connections for easy field wiring and the ProtEX-MAX goes one step further in convenience by also making them removable.



USB Port for MeterView Pro



USB cable conveniently plugs into side of ProtEX-MAX meter

Hazardous Area Certification

The ProtEX-MAX is certified by CSA as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof and is approved by ATEX and IECEx as Dust-Ignition-Proof / Flame-Proof.

Wide Operating Temperature Range

The ProtEX-MAX can operate from -55 to 65°C (-67 to 149°F) meaning it can be installed in a wide variety of indoor and outdoor industrial applications.

VIDEOS TO WATCH



ProtEX-MAX Explosion-Proof Meters and Indicators

Learn About the
ProtEX-MAX Series.

The ProtEX-MAX meter is very similar to the PROVu in features and functionality so the following videos might be of interest:



PROVu Series Overview

Learn About All the
Meters in the PROVu
Series!



PROVu Multi-Pump Alternation

Learn How to Use the
PROVu as a Pump
Controller.



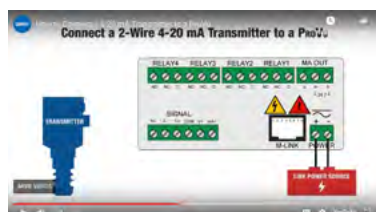
PROVu Function Keys

Learn How the PROVu's
Function Keys Increase
the Utility of the PROVu.



Connect a PROVu to a PC Using MeterView Pro

Learn How Easy it is
to Use MeterView Pro
Software.



Connect a 2-Wire 4-20 mA Transmitter to a PROVu

Learn How to Connect
Your Transmitter to a
PROVu.

OPERATIONAL FEATURES

Function Keys, F4 Terminal, Digital Inputs

There are three ways the user can interact with the ProtEX-MAX to perform a variety of useful functions:

1. Three Front Panel Function Keys

The default settings for the function keys are:



Reset Max/Min
Reading



Display Max/Min
Reading

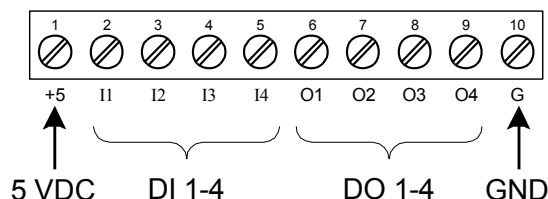


Acknowledge
Relays

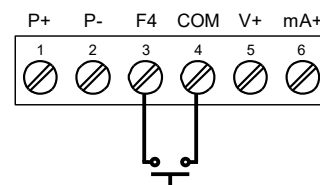
One of the most common uses for a front panel function key is to reset the total or grand total.

2. Built-in Digital Inputs/Outputs

The ProtEX-MAX comes with five digital inputs and four digital outputs. The digital inputs can be used to reset the total and grand total, operate with the tare, reset tare, or interlock relays feature, force relays on from a signal from a PLC or relay on other equipment, and much more. The digital inputs can also be connected to an appropriately approved control station to provide remote control of the programming / operation buttons. The digital outputs can be used to send signals to PLCs and other devices.



4 Digital Inputs & 4 Digital Outputs



F4 Terminal for Digital Input

3. CapTouch Through-Glass Buttons

The ProtEX-MAX is equipped with four capacitive sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover (and exposing the electronics) in a hazardous area. The CapTouch buttons are configured by default to duplicate the function of the front panel mechanical pushbuttons associated with the integrated meter.

Function Key, Digital Inputs, & Digital Outputs Descriptions

The following table describes the actions that ProtEX-MAX function keys and digital inputs can be programmed to perform. The table also describes how the digital outputs can be programmed to remotely monitor the ProtEX-MAX's alarm relay states, or the states of a variety of actions and functions executed by the meter.

Display	Description	Item	Display	Description	Item
RELAY	Directly access the relay menu	FK, DI	F On 1*	Force relay 1 (*through 4) into the on state. This function is used in conjunction with a digital input to achieve interlock functionality.	FK, DI
SEt 1*	Directly access the set point menu for relay 1 (*through 4)	FK, DI	Control	Directly access the control menu	FK, DI
RLY d	Disable all relays until a button assigned to enable relays (Rly E) is pressed	FK, DI	disAbL	Disable the selected function key or digital I/O	FK, DI
RLY E	Enable all relays to function as they have been programmed	FK, DI	AcH	Acknowledge all active relays that are in a manual operation mode such as auto-manual or latching	FK, DI, DO
0 HoLd	Hold current relay states and analog output as they are until a button assigned to enable relays (Rly E) is pressed	FK, DI	rESEt	Directly access the reset menu	FK, DI
d HoLd	Hold the current display value, relay states, and analog output momentarily while the function key or digital input is active. The process value will continue to be calculated in the background.	FK, DI	rSt t	Reset the total	FK, DI
Ln1 Hi	Display maximum display value on line 1	FK, DI	rSt Gt	Reset the grand total	FK, DI
Ln1 Lo	Display minimum display value on line 1	FK, DI	rSt H1	Reset the stored maximum display value	FK, DI, DO
Ln1 HL	Display maximum & minimum display values on line 1	FK, DI	rSt Lo	Reset the stored minimum display value	FK, DI, DO
Ln2 Hi	Display maximum display value on line 2	FK, DI	rSt HL	Reset the stored maximum & minimum display values	FK, DI, DO
Ln2 Lo	Display minimum display value on line 2	FK, DI	mEnu	Mimic the menu button functionality (digital inputs only)	DI
Ln2 HL	Display maximum & minimum display values on line 2	FK, DI	rIGHt	Mimic the right arrow/F1 button functionality (digital inputs only)	DI
Ln2 Gt	Display the grand total on line 2	FK, DI	uP	Mimic the up arrow/F2 button functionality (digital inputs only)	DI
			EntEr	Mimic the enter/F3 button functionality (digital inputs only)	DI
			ALAr 1*	Provide indication when alarm 1 (*through 4) has been triggered (digital outputs only)	DO

FK: Function Keys

DI: Digital Inputs

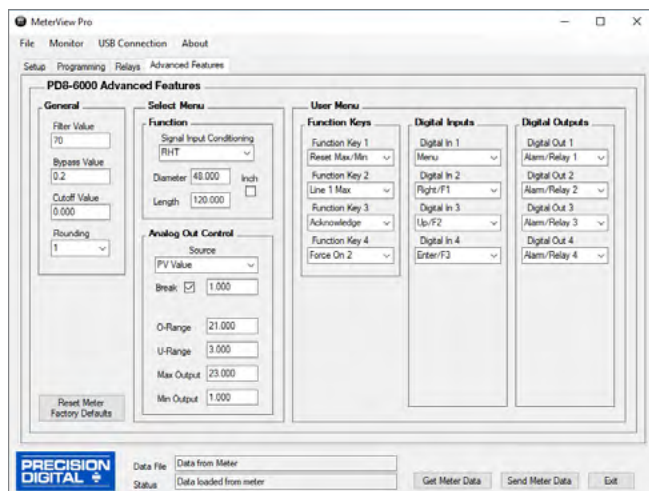
DO: Digital Outputs



Watch video about the programmable function keys, digital inputs, and all the capabilities these features offer on the PROVu Series, which work similarly on the ProtEX-MAX.

Remote Operation of Front Panel Buttons

The user can operate the front panel buttons from a remote location by using digital inputs programmed in the following manner:

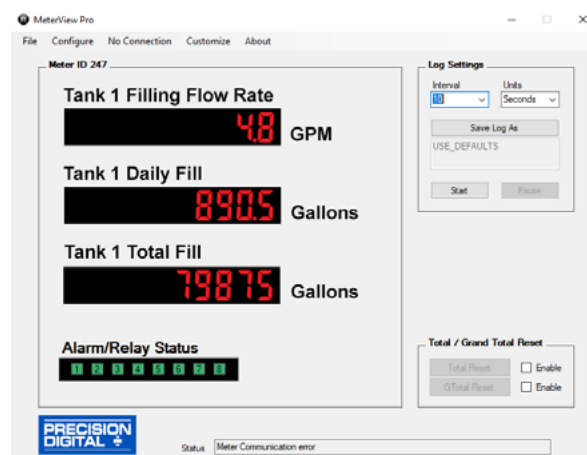


Max / Min Display

Max/Min (or Peak/Valley) is standard on the ProtEX-MAX PD8-6200 / PD8-6300. Either display can be configured to show either maximum or minimum excursion since last reset. The displays can also be configured to toggle between Max and Min values. Both values can be simply reset from the front panel.

MeterView Pro Monitoring & Datalogging Software

Not only does free MeterView Pro software greatly simplify setup and programming of the ProtEX-MAX, it can also be used to monitor and datalog your process.



- Custom Tags: i.e. Filling Flow Rate
- Custom Units: i.e. GPM, Gallons, Feet, Percent
- Alarm Status Indicators

Datalog Report

Collected data logger information can be sent to a CSV file for importing into a spreadsheet program. Below is an example of one such file. Of course, once within the spreadsheet, much can be done to customize the data.

Meter ID: 247 Serial Port: COM49 Logging Rate: 1 update every 10 Seconds									
Date & Time	Tank 1 Filling Flow Rate	Units	MAX	Units	MIN	Units	R1	R2	R3 R4
8/12/2022 10:39	3.8 GPM	3.8 GPM	3.8 GPM	3.8 GPM	3.8 GPM	3.8 GPM	Off	On	Off Off
8/12/2022 10:39	3.7 GPM	3.7 GPM	3.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	Off	On	Off Off
8/12/2022 10:39	3.8 GPM	3.8 GPM	3.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	Off	On	Off Off
8/12/2022 10:39	4.1 GPM	4.1 GPM	4.1 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	Off Off
8/12/2022 10:40	4.4 GPM	4.4 GPM	4.4 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	Off Off
8/12/2022 10:40	4.4 GPM	4.4 GPM	4.4 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On Off
8/12/2022 10:40	4.7 GPM	4.7 GPM	4.7 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On On
8/12/2022 10:40	4.8 GPM	4.8 GPM	4.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On On
8/12/2022 10:40	4.9 GPM	4.9 GPM	4.9 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On On
8/12/2022 10:40	5.3 GPM	5.3 GPM	5.3 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On On
8/12/2022 10:41	5.8 GPM	5.8 GPM	5.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On Off
8/12/2022 10:41	5.4 GPM	5.8 GPM	5.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On Off
8/12/2022 10:41	5.4 GPM	5.8 GPM	5.8 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On Off
8/12/2022 10:41	6.1 GPM	6.1 GPM	6.1 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	On	On On
8/12/2022 10:41	6.3 GPM	6.3 GPM	6.3 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	Off	On On
8/12/2022 10:41	6.3 GPM	6.3 GPM	6.3 GPM	3.7 GPM	3.7 GPM	3.7 GPM	On	Off	On On

Relay Control

Relays can be controlled from MeterView Pro for testing purposes. This is commonly done to determine whether the relays are functioning properly. In the *Setup* window, under *Relay and Digital Out Test* you have the option of selecting the relays you want in an ON state or OFF state and also whether you want to leave the relays in manual control or to return them to automatic operation.



ACCESSORIES

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
PD9501	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
PD9502	Low-Cost Signal Generator

⚠ WARNING

- These accessories do not carry hazardous area approvals and are thus not suitable for location in hazardous areas. The use of additional protective devices may allow them 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.

Complete Product Line of Displays and Controllers

IN ALL SHAPES, SIZES & LOCATIONS



Big, Bright Displays
For Indoor or Outdoor
in Bright Sunlight



Large Dual-Line
6-Digit Display



24 VDC
Transmitter
Power Supply



MeterView® Pro USB
Programming Software



Universal 85-265
VAC or 12-24 VDC
Input Power
Options



4-20 mA, 0-10 V,
Thermocouple, RTD,
Strain Gauge, High
Voltage, & Modbus Inputs



Up To Four
3 A Form C
Relays (SPDT)



SP Ex IECEx CE

EXPLOSION-PROOF ProtEX-MAX Series

- NEMA 4X, IP68 Rated Enclosure
- CapTouch Through-Glass Buttons
- Operating Temperature of -55 to 65°C
- Worldwide Approvals

LARGE DISPLAYS Helios Series

- 1.8" Digits Readable From 100 Feet
- NEMA 4X, IP65 Rated Enclosure
- Operating Temperature of -40 to 65°C
- Now UL and C-UL Approved!

UL CE

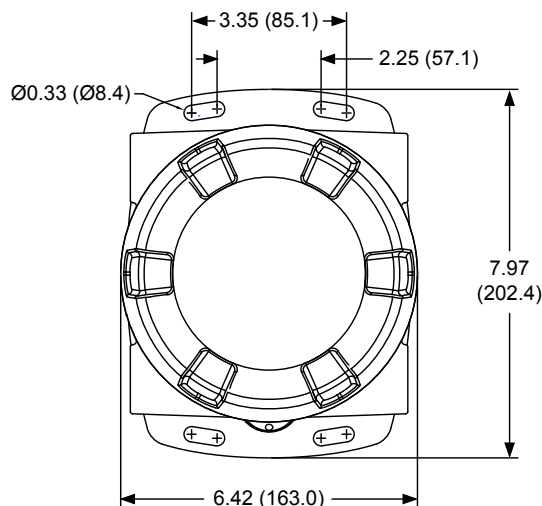
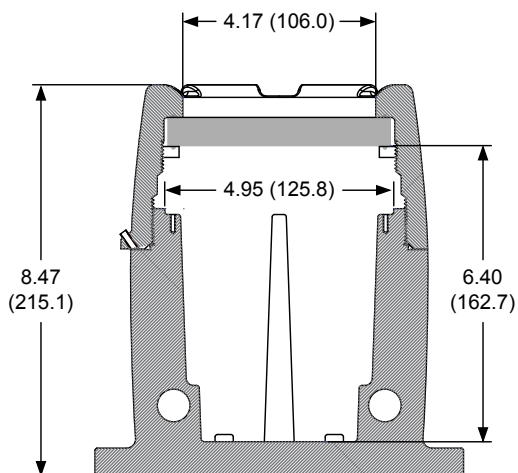
PANEL METERS ProVu Series

- NEMA 4X, IP65 Rated Front
- Programmable Function Keys
- UL, C-UL, and CE Approvals
- 1/8 DIN Size

Go to PREDIG.COM for details on ProVu, ProtEX-MAX and Helios Series Meters

DIMENSIONS

Units: Inches (mm)

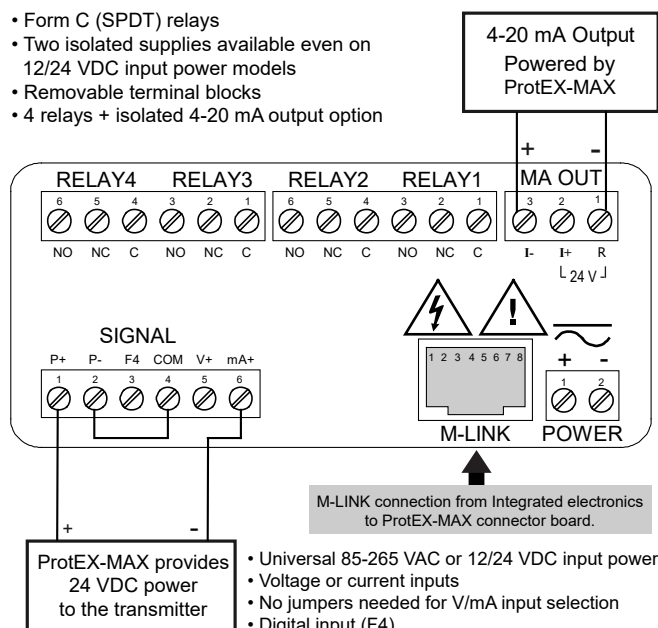


Download free 3-D CAD files of these instruments to simplify your drawings!

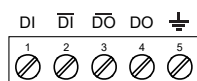
predig.com/documentation-cad

CONNECTIONS

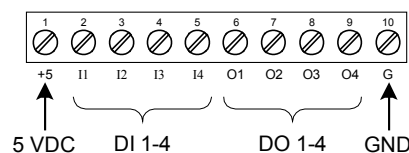
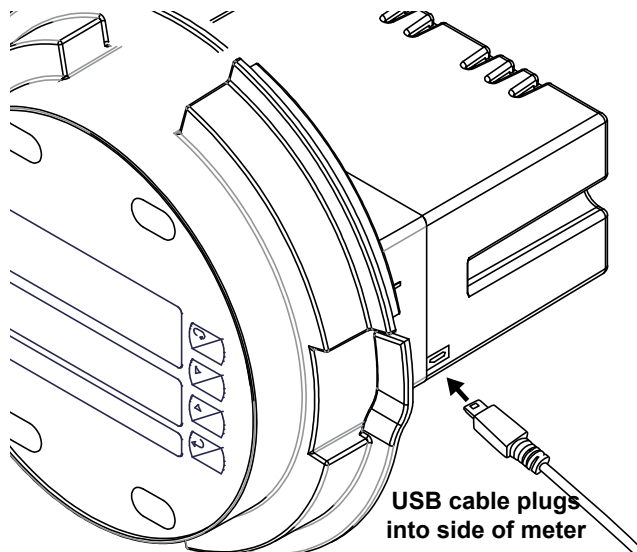
- Form C (SPDT) relays
- Two isolated supplies available even on 12/24 VDC input power models
- Removable terminal blocks
- 4 relays + isolated 4-20 mA output option



Connections for PD8-6200-6H7 & PD8-6200-7H7



RS-485 Connections



Digital I/O Connections

SPECIFICATIONS

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

General

Display	Display Line 1: 0.60" (15 mm) high, red LEDs Display Line 2: 0.46" (12 mm) high, red LEDs 6 digits each (-99999 to 999999), with lead zero blanking
Display Intensity	Eight user selectable intensity levels. Default intensity is six.
Display Update Rate	5/second (200 ms)
Overrange	Display flashes 999999
Underrange	Display flashes -99999
Display Assignment	Display Line 1: Rate, total, grand total, alternate (rate/total, rate/grand total, rate/units, total/units, and grand total/units), set points, max/min, and Modbus input Display Line 2: Same as Display Line 1; plus units, tag or turned off. Additional displays are available if parameter total is off, and parameter d-SCAL is on: gross weight, gross & net weight, PV1, PV2, and PCT (refer to PD8-6000 instruction manual.)
Programming Methods	Four CapTouch through-glass buttons when cover is installed. Mechanical buttons can be used with the cover removed. Free PC-based USB MeterView Pro programming software.
Noise Filter	Programmable from 2 to 199 (0 will disable filter)
Filter Bypass	Programmable from 0.1 to 99.9% of calibrated span
Recalibration	All ranges are calibrated at the factory. Recalibration is recommended at least every 12 months.
Max/Min Display	Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.
Rounding	Select 1, 2, 5, 10, 20, 50, or 100 (e.g. rounding = 10, value = 123.45, display = 123.50)
Password	Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals. Pass 1: Allows use of function keys and digital inputs Pass 2: Allows use of function keys, digital inputs and editing set/reset points Pass 3: Restricts all programming, function keys, and digital inputs Total: Prevents resetting the total manually Gtotal: Prevents resetting the grand total manually
Non-Volatile Memory	Total and Grand Total values, and all programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Power Options	85-265 VAC 50/60 Hz; 90-265 VDC, 20 W max; 12-24 VDC, 12-24 VAC, 15 W max. Powered over USB for configuration only.

Fuse	Required external fuse: UL Recognized, 5 A max, slow blow; up to 6 meters may share one 5 A fuse
Normal Mode Rejection	Greater than 60 dB at 50/60 Hz
Isolation	4 kV input/output-to-power line 500 V input-to-output or output-to-P+ supply
Overvoltage Category	Installation Overvoltage Category II: Local level with smaller transient overvoltages than Installation Overvoltage Category III.
Environmental	T6 Class operating temperature range Ta = -55 to 60°C T5 Class operating temperature range Ta = -55 to 65°C Storage temperature range: -55 to 85°C (-67 to 185°F) Relative humidity: 0 to 90% non-condensing
Max Power Dissipation	Maximum power dissipation limited to 15.1 W
Connections	Power, signal, relays, mA out: Removable screw terminal blocks accept 12 to 22 AWG wire RS-485: Removable screw terminal block accepts 16 to 30 AWG wire Digital I/O: Removable screw terminal blocks accept 16 to 30 AWG wire
Mounting	Wall Mounting: Four (4) mounting holes provided for mounting meter to wall. Pipe Mounting: Optional pipe mounting kit (PDA6848) allows for pipe mounting. Sold separately.
Tightening Torque	Screw terminal connectors: 5 lb-in (0.56 Nm)
Overall Dimensions	6.42" x 7.97" x 8.47" (W x H x D) (163 mm x 202 mm x 215 mm)
Weight	Aluminum: 14.7 lbs (6.67 kg) Stainless Steel: 23.5 lbs (10.66 kg)
Warranty	3 years parts & labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

Process Inputs

Inputs	Field selectable: 0-20 mA, 4-20 mA ±10 V (0-5 V, 1-5 V, 0-10 V) Modbus PV (Slave)
Isolated Transmitter Power Supply	Terminals P+ & P-: 24 VDC ± 10%. selectable for 24, 10, or 5 VDC supply (internal jumper J4). All models transmitter supply rated @ 25 mA max.
Accuracy	±0.03% of calibrated span ±1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span
Temperature Drift	0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient
Input Signal Conditioning	Linear, square root, programmable exponent, or round horizontal tank volume calculation
Multi-Point Linearization	2 to 32 points
Programmable Exponent	User selectable from 1.0001 to 2.9999 for open channel flow
Round Horizontal Tank	Diameter & Length: 999.999 inch or cm calculates volume in gallons or liters respectively
Low-Flow Cutoff	0.1 to 999,999 (0 disables cutoff function). Point below at which display always shows zero.
Decimal Point	Up to five decimal places or none: d.ddddd, d.dddd, d.ddd, d.dd, d.d, or ddddd
Calibration Range	Input Range Minimum Span Input 1 & 2
	4-20 mA 0.15 mA
	±10 V 0.10 V
	An error message will appear if the input 1 and input 2 signals are too close together.
Input Impedance	Voltage ranges: greater than 500 kΩ Current ranges: 50 - 100 Ω (depending on internal resettable fuse impedance)
Input Overload	Current input protected by an internal resettable fuse, 30 VDC max. Fuse resets automatically after fault is removed.
HART Transparency	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.

Rate/Totalizer

Rate Display Indication	-99999 to 999999, lead zero blanking. "R" LED illuminates while displaying rate
Time Base	User selectable rate time base in units per second, minute, hour, or day
Total Display & Total Overflow	0 to 999,999; automatic lead zero blanking. "T" LED is illuminated while displaying total or grand total. Up to 999,999,999 with total-overflow feature. "oF" is displayed to the left of total overflow and ▲ LED is illuminated.
Total Decimal Point	Up to five decimal places or none: d.ddddd, d.dddd, d.ddd, d.dd, d.d, or ddddd Total decimal point is independent of rate decimal point.
Totalizer	Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base must be selected according to the time units in which the rate is displayed.
Totalizer Rollover	Totalizer rolls over when display exceeds 999,999,999. Relay status reflects display.
Total Overflow Override	Program total reset for automatic with 0.1 second delay and set point 1 for 999,999
Totalizer Presets	Four, user selectable under setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter for total alarm indication.
Programmable Delay On Release	0.1 and 999.9 seconds; applied to the first relay assigned to total or grand total. If the meter is programmed to reset total to zero automatically when the preset is reached, then a delay will occur before the total is reset.
Total Reset	User selectable via CapTouch button, F4 terminal at back of meter, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
Total Reset Password	Total and grand total passwords may be entered to prevent resetting the total or grand total from the programming or CapTouch buttons.
Non-Resettable Total	The grand total can be programmed as a non-resettable total by entering the password "050873".
Non-Volatile Memory	Total and Grand Total values are stored in non-volatile memory for a minimum of ten years if power is lost.

⚠ CAUTION

- Once the Grand Total has been programmed as "non-resettable" the feature CANNOT be disabled.

Relays

Rating	4 SPDT (Form C) internal and rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (≈ 50 W) @ 125/250 VAC for inductive loads
Noise Suppression	Noise suppression is recommended for each relay contact switching inductive loads.
Relay Assignment	Relays may be assigned to rate, total, grand total, or Modbus input
Deadband	0-100% of span, user programmable
High or Low Alarm	User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turn off).
Relay Operation	<ul style="list-style-type: none"> Automatic (non-latching) and/or manual reset Latching (requires manual acknowledge) with or without clear Pump alternation control (2-4 relays) Sampling (based on set point and time) Off (disable unused relays and enable Interlock feature) Manual on/off control mode
Relay Reset (Acknowledge)	User selectable via front panel button, F4 digital input, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications.
Time Delay	0 to 999.9 seconds, on & off relay time delays. Programmable and independent for each relay.
Fail-Safe Operation	Programmable and independent for each relay. Note: Relay coil is energized in non-alarm condition. In case of power failure, relay will go to alarm state.
Auto Initialization	When power is applied to the meter, relays will reflect the state of the input to the meter.

USB Connection

Function	Programming only
Compatibility	USB 2.0 Standard, Compliant
Connector Type	Micro-B receptacle
Cable	USB A Male to Micro-B Cable
Driver	Microsoft® Windows® XP/Vista/7/8/10
Power	USB port provides power to the meter. DO NOT apply AC or DC power to the meter while the USB port is in use.

Isolated 4-20 mA Transmitter Output

Output Source	Rate/process, total, grand total, max, min, set points 1-4, or manual control mode		
Scaling Range	1.000 to 23.000 mA for any display range		
Calibration	Factory calibrated: 4.000 to 20.000 = 4-20 mA output		
Analog Out Programming	23.000 mA maximum for all parameters: Overrange, underrange, max, min, and break		
Accuracy	$\pm 0.1\%$ FS ± 0.004 mA		
Temperature Drift	0.4 μ A/°C max from 0 to 65°C ambient, 0.8 μ A/°C max from -40 to 0°C ambient Note: Analog output drift is separate from input drift.		
Isolated Transmitter Power Supply	Terminals I+ & R: 24 VDC $\pm 10\%$. Used to power the 4-20 mA. All models rated @ 25 mA max.		
External Loop Power Supply	35 VDC maximum		
Output Loop Resistance	Power supply	Minimum	Maximum
	24 VDC	10 Ω	700 Ω
	35 VDC (external)	100 Ω	1200 Ω

RS-485 Serial Communications

Compatibility	EIA-485
Connectors	Removable screw terminal connector
Max Distance	3,937' (1,200 m) max
Status Indication	Separate LEDs for Power (P), Transmit (TX), and Receive (RX)

Modbus® RTU Serial Communications

Slave Id	1 – 247 (Meter address)
Baud Rate	300 - 19,200 bps
Transmit Time Delay	Programmable between 0 and 199 ms
Data	8 bit (1 start bit, 1 or 2 stop bits)
Parity	Even, Odd, or None with 1 or 2 stop bits
Byte-To-Byte Timeout	0.01 – 2.54 second
Turn Around Delay	Less than 2 ms (fixed)

Note: Refer to the ProtEX-MAX Modbus Register Tables located at www.predig.com for details.

Digital Input (F4)

Function	Reset total, remote operation of front-panel buttons, acknowledge/reset relays, reset max/min values.
Contacts	3.3 VDC on contact. Connect normally open contacts across F4 to COM
Logic Levels	Logic High: 3 to 5 VDC Logic Low: 0 to 1.25 VDC

Digital Inputs & Outputs

Function	Remote operation of front-panel buttons, acknowledge/reset relays, reset total and grand total, reset max/min values.
Channels	4 digital inputs & 4 digital outputs
Digital Input Logic High	3 to 5 VDC
Digital Input Logic Low	0 to 1.25 VDC
Digital Output Logic High	3.1 to 3.3 VDC
Digital Output Logic Low	0 to 0.4 VDC
Source Current	10 mA maximum output current
Sink Current	1.5 mA minimum input current
+5 V Terminal	To be used as pull-up for digital inputs only. Connect normally open push buttons across +5 V & DI 1-4.

WARNING

- **DO NOT** use +5 V terminal to power external devices.

MeterView Pro Software

Availability	Download directly from meter or from www.predig.com/software
System Requirements	Microsoft® Windows® XP/Vista/7/8/10
Communications	USB 2.0 (for programming only) (USB A Male to Micro-B Cable) RS-485 to USB converter (programming, monitoring, and data logging)
Configuration	Configure meters one at a time
Power	USB port provides power to the meter. DO NOT apply AC or DC power to the meter while the USB port is in use.

Enclosure

Material: AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated. SS Models: ASTM A743 CF8M investment-cast 316 stainless steel

Gasket: Fluoroelastomer

Rating: NEMA 4X, IP68 Explosion-proof

Color: AL: Blue. SS: Silver.

Window: Borosilicate glass

Conduits: Four 3/4" NPT threaded conduit openings

Conduit Stopping Plugs: Sold separately

Flanges: Two built-in flanges for wall and pipe mounting.

Tamper-Proof Seal: Cover may be secured with tamper-proof seal.

Overall Dimensions: 6.42" x 7.97" x 8.47" (W x H x D) (163 mm x 202 mm x 215 mm)

Weight: AL: 14.7 lbs (6.67 kg). SS: 23.5 lbs (10.66 kg).

ATEX: Flameproof 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

IECEX: Flameproof and dust protection

Ex db IIC Gb

Ex tb IIIC Db

IP66/IP68

Tamb: -55°C to +85°C

Certificate Number: IECEx SIR 19.0075U

CSA: 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 Number: CSA19.80011200U

UL: 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 Db

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 approvals on the entire instrument.

General Compliance Information

Electromagnetic Compatibility

Emissions

EN 55022

Class A ITE emissions requirements

Radiated Emissions: Class A

AC Mains Conducted Emissions: Class A

Immunity

EN 61326-1

Measurement, control, and laboratory equipment

EN 61000-6-2

EMC heavy industrial generic immunity standard

RFI - Amplitude Modulated:

80 -1000 MHz 10 V/m 80% AM (1 kHz)

1.4 - 2.0 GHz 3 V/m 80% AM (1 kHz)

2.0 - 2.7 GHz 1 V/m 80% AM (1 kHz)

Electrical Fast Transients: ±2kV AC mains, ±1kV other

Electrostatic Discharge: ±4kV contact, ±8kV air

RFI - Conducted: 10V, 0.15-80 MHz, 1kHz 80% AM

AC Surge: ±2kV Common, ±1kV Differential

Surge: 1KV (CM)

Power-Frequency Magnetic Field:

30 A/m 70%V for 0.5 period

Voltage Dips: 40%V for 5 & 50 periods

70%V for 25 periods

Voltage Interruptions: <5%V for 250 periods

Note: Testing was conducted on meters with cable shields grounded at the point of entry representing installations designed to optimize EMC performance.

Product Ratings and Approvals

CSA: Class I, Division 1, Groups B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1, T5
Class III, Division 1, T6 (Ta max = 60°C)
Ex db IIC T5
Ex db IIC T6 (Ta max = 60°C)
Ex tb IIIC T90°C
Ta = -55°C to +65°C
Enclosure: Type 4X & IP66 / IP68
CSA Certificate: CSA 12 2531731

ATEX: II 2 G D
Ex db IIC T* Gb
Ex tb IIIC T90°C Db IP68
Ta = -55°C to +*°C
*T6 = -55°C to +60°C
*T5 = -55°C to +65°C
Certificate Number: Sira 12ATEX1182X

IECEX: Ex db IIC T* Gb
Ex tb IIIC T90°C Db IP68
Ta = -55°C to +*°C
*T6 = -55°C to +60°C
*T5 = -55°C to +65°C
Certificate Number: IECEx SIR 12.0073X

ATEX/IECEX Specific Conditions of Use:

1. The equipment label and epoxy coating may generate an ignition-capable level of electrostatic charges under certain extreme conditions. The user should ensure that the equipment is not installed in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
2. Flameproof joints are not intended to be repaired.
3. All entry closure devices shall be suitably certified as "Ex d", "Ex t" and "IP66/68" as applicable. Suitable thread sealing compound (non-setting, non-insulating, non-corrosive, not solvent based, suitable for the ambient rating) must be used at the NPT conduit entries to achieve the IPx8 rating while maintaining the Ex protection concept.

Year of Construction

This information is contained within the serial number with the first four digits representing the year and month in the YYMM format.

For European Community

The ProtEX-MAX must be installed in accordance with the ATEX directive 2014/34/EU, the product manual, and the product certificate Sira 12ATEX1182X.

ORDERING INFORMATION

ProtEX-MAX PD8-6200 • Aluminum Enclosure		
85-265 VAC Model	12-24 VDC Model	Options Installed
PD8-6200-6H0	PD8-6200-7H0	None
PD8-6200-6H7	PD8-6200-7H7	4 Relays & 4-20 mA Output
Note: 24 V Transmitter power supply standard on all models.		

ProtEX-MAX PD8-6200 • Stainless Steel Enclosure		
85-265 VAC Model	12-24 VDC Model	Options Installed
PD8-6200-6H0-SS	PD8-6200-7H0-SS	None
PD8-6200-6H7-SS	PD8-6200-7H7-SS	4 Relays & 4-20 mA Output
Note: 24 V Transmitter power supply standard on all models.		

Accessories	
Model	Description
PDAPLUG75	3/4" NPT 316 Stainless Steel Stopping Plug with Approvals
PDA-SSTAG	Stainless Steel Tag
PDA6848-SS	Pipe Mounting Kit Stainless Steel
PDA7485-I	RS-232 to RS-422/485 Isolated Converter
PDA8485-I	USB to RS-422/485 Isolated Converter

Your Local Distributor is:

**WARNING**

Cancer and Reproductive Harm - www.P65Warnings.ca.gov

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