PD8-6100 Explosion-Proof Strain Gauge, Load Cell & mV Meter
Data Sheet

ProtEx™ MAX

CSA · Ex · IECEx · CE

CapTouch™

MeterView Pro
USB Install

- **Fully Approved Explosion-Proof Meter**
- **15, 30, 150, 300 mV unipolar; ±15, ±25, ±150, ±250 mV bipolar Inputs**
- **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°**
- **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**
- **Operating Temperature Range: -55 to 65°C (-67 to 149°F)**
- **CSA Certified as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof**
- **ATEX and IECEx Certified as Dust-Ignition-Proof / Flame-Proof**

- **Input Power Options: 85-265 VAC / 90-265 VDC or 12-24 VDC / 12-24 VAC**
- **Supports One (1) 350 Ω Load Cell**
- **Capture or Programmable Tare Feature**
- **Auto-Zero Feature Eliminates Zero Drift**
- **Ratiometric Operation**
- **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**
- **Stainless Steel Tag Available**
- **3-Year Warranty**

PRECISION DIGITAL CORPORATION

PRECISION DIGITAL
www.predig.com

The Complete ⟨ProtEX™⟩ Series
MAX

CSA   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
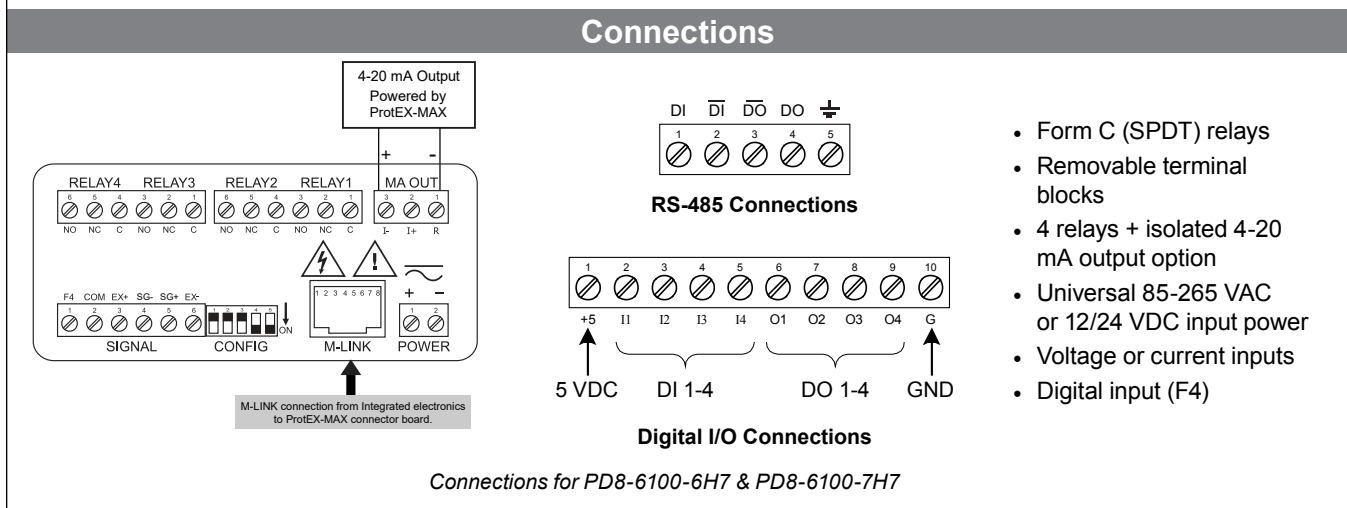**Feet & Inches Modbus® Scanner**

PD8-7000
Temperature Meter

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

TABLE OF CONTENTS

OVERVIEW

Front

CSA

IECEx

CE

CapTouch™

Through-Glass Button Programming

MeterView Pro
USB Installation

Mounting Flanges (Up to 2½" Pipe)

Locking Screw

CapTouch Menu Button

Large 0.6" Digits On Main Display

Standard or Custom Engineering Units

CapTouch Zero Meter/ Right Arrow

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

CapTouch Enter or Alarm Acknowledge Button

Programmable Function Keys

Alarm Status Indicators

CapTouch Reset Tare/ 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   CONFIG   M-LINK   POWER

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

RS-485 Connections

DI DI̅ DO̅ DO ⏚

Digital I/O Connections

+5 I1 I2 I3 I4 O1 O2 O3 O4 G

5 VDC   DI 1-4   DO 1-4   GND

- Form C (SPDT) relays
- 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
- Digital input (F4)

Connections for PD8-6100-6H7 & PD8-6100-7H7

The Only Explosion-Proof Strain Gauge and Load Cell Meter You Will Ever Need

The ProtEX-MAX PD8-6100 is a full-featured multipurpose, easy-to use digital strain gauge & load cell meter ideal for weight and force measurement applications. The PD8-6100 has all the same features as our PD6100 1/8 DIN meter, as a fully approved explosion-proof product. The product is certified by CSA as Explosion-Proof / Dust-Ignition-Proof / Flame-Proof, and is ATEX and IECEx certified as Dust-Ignition-Proof / Flame-Proof.

Besides being suitable for hazardous areas, the number one feature that makes the PD8-6100 such a useful device is its built-in 5, 10 or 24 VDC power supply. This feature not only saves the cost of an external power supply, but also greatly simplifies wiring. In addition, there is a second 4 VDC @ 25 mA power supply provided with the 4 20 mA output option.

The first thing you notice about the PD8-6100 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 indicate PV, maximum (peak), minimum (valley), alternating max/min, one of four alarm set points, or Modbus input. The secondary display can also be configured to display engineering units, set points, user defined legends, or simply turned off.

The four relays can be used for alarm indication or process control such as pump alternation control. The 4-20 mA isolated output, Modbus RTU serial communications, and digital I/O options make the PD8-6100 an excellent addition to any system. 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

A powerful isolated power supply is a standard feature on the ProtEX-MAX meter. It can be configured for 5, 10 (default), or 24 V (not to be used with strain gauge or load cell) by means of a simple internal jumper (see manual). An additional power supply (24 V @ 25 mA) is standard with the 4-20 mA output option.
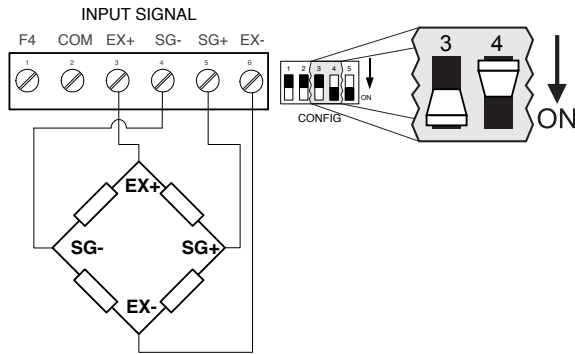
Meter Powers 4-20 mA Output

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.
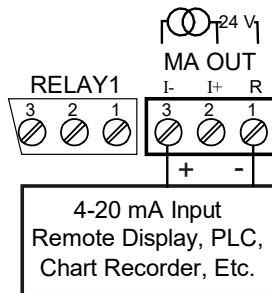
Fuse Prevents Current Overload

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.

FEATURE RICH AND FLEXIBLE

Zero the Meter

The zero function zeroes out the display. In the case where there has been drift in the strain gauge output over time, zero is used to eliminate this drift and provide a true zero reading.

For example, if an empty scale were to display a value other than zero, the zero function would tell the meter to show zero regardless of the current input signal.

Capture Tare

The tare function also zeroes out the display. In the case of scale weight, tare is used to eliminate container weight and provide net weight readings.

If the tare value is a known constant, such as a container weight, this may be programmed in manually. The captured tare may be reset manually with any function key or digital input.

Before Tare   After capture tare   After reset tare

Automatic Unit Conversion

In addition to entering a custom unit or tag, pre-defined engineering units may be selected: lb, kg, ounce, gram, ton (short), tonne (metric ton). Automatic unit conversions are done when switching between pre-defined units, without the need for additional scaling.

The meter converts the reading according to the unit selected. (e.g. 100.00 lb = 45.36 kg = 45359.2 g = 1600 oz).

Auto-Zero

The auto-zero feature corrects for drift that can occur over time that causes the input signal to slowly change. The meter will continue to read zero despite slow and small changes to the input signal around zero. The auto-zero sensitivity is set by the user as a percent of full scale.

Shunt Calibration Check

The PD8-6100 is equipped with a means of simulating strain in a strain gauge bridge circuit, via an included shunt resistor in the meter. This technique can be used as a means of verifying the meter setup and output behavior by simulating a physical input. With no load connected, the enabling of the shunt resistor will simulate a 70% full scale load in the case of a 350 Ω Strain Bridge.

Ratiometric Compensation

This feature compensates for changes in the strain gauge input signal that are due to variations in the internal or external excitation voltage. The compensation is effective for up to ±5% variation in the excitation power supply.

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
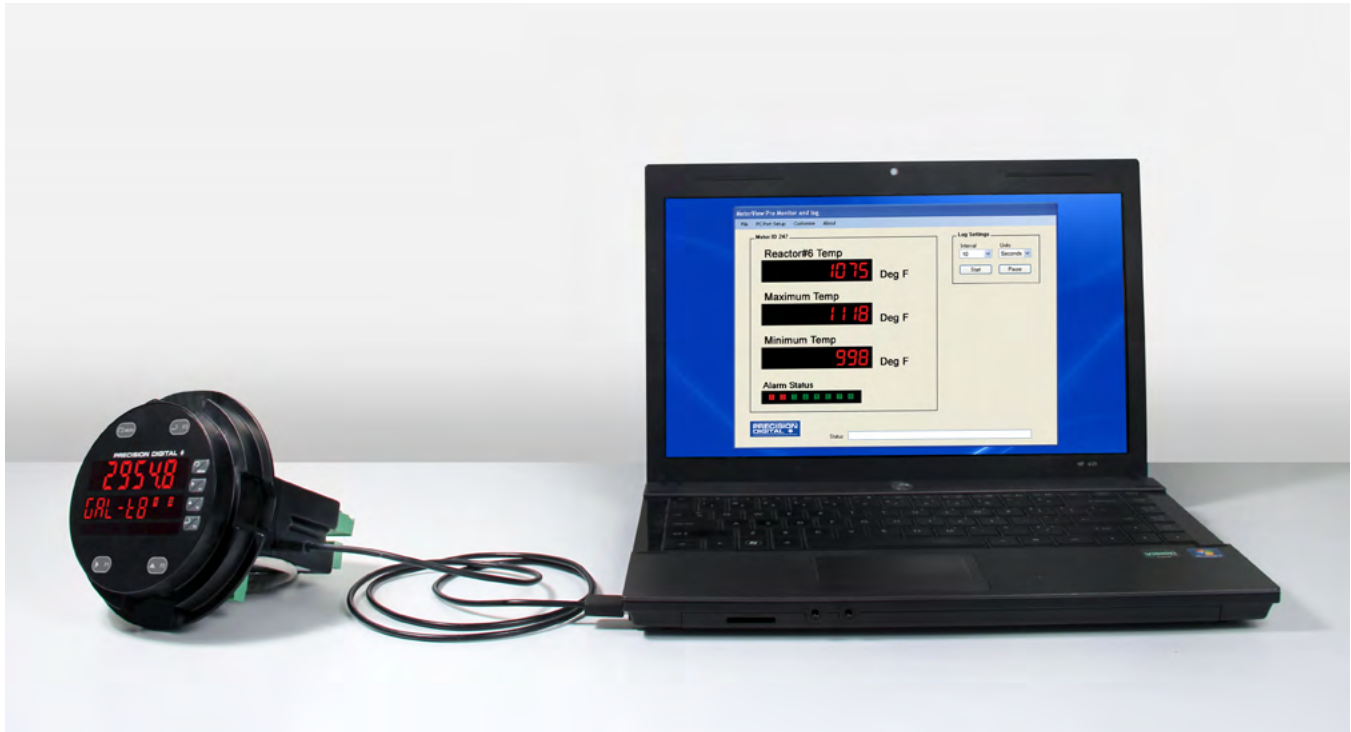
The ProtEX-MAX comes preloaded with free MeterView Pro programming software that connects and installs directly to your PC with a standard USB cable, also provided free with each instrument. This eliminates the need to insert CDs, install drivers, or download software from the internet. When you connect 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.
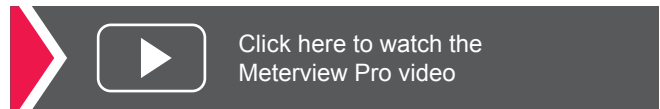
Click here to watch the Meterview Pro video

CAPTOUCH 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.

Capacitive touch technology

More reliable & responsive

Operate meter without removing the cover

ADVANCED DISPLAY FEATURES

Dual-Line Makes All the Difference

The main display can be programmed to indicate PV, maximum (peak), minimum (valley), alternating maximum/minimum, one of four alarm set points, or Modbus input. The secondary display can be configured to display the input in a different scale, engineering units, set points, user defined messages, or simply turned off.

The ProtEX-MAX's dual-line display makes all the difference both when programming the instrument and when using it in the field. When programming the instrument, the dual-line display prompts for the needed information and also helps you keep track of where you are in the setup process. When using the instrument, the dual-line display provides more information such as displaying the input in two different scales like height and volume for a level application. We call this the Dual-Scale feature.

Programming Assistance

The ProtEX-MAX's dual-line display makes programming the instrument much easier because the secondary display prompts for the needed information and also helps you keep track of where you are in the setup process.

The ProtEX-MAX is prompting for the value for Input 2 and displaying the default value of 100 mV. The "0" is brighter than the rest of the digits indicating that it is the number that will be changed by the Up arrow.

The ProtEX-MAX is now prompting for what the user wants Display 2 to be; that is the value that corresponds to 100 mV. In this case Display 2 is currently set to 100.00.

Dual-Scale Display Feature

The ProtEX-MAX PD8-6100 has a rather unique, and very flexible dual-scale capability; a second scaled display can represent the measured input in a different form (i.e. gallons & height). This is of particular value in weight applications. Please see the examples shown below.

Volume & Height   Force & mV

Other Uses for Second Line

The secondary display can also be used indicate units, net and gross, a tag, or even a setpoint as the following pictures illustrate:

Weight & Units   Net & Gross

mV & Setpoint   Weight & Max (Peak)

Rounding Feature 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.
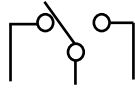
Super-Bright Display

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.

OUTPUTS

Relay Outputs

The ProtEX-MAX is available with four 3 A Form C relays (SPDT) with multiple power loss fail-safe options. Relays can be configured for proper protective action upon input loop break. Relay ON and OFF delay times are user adjustable. Up to eight front panel indicators show alarm and/or relay state. All relays can be configured for 0-100% deadband.

Relay Operation/Configuration

There are powerful relay functions that can be configured in the ProtEX-MAX meter, including:

- Automatic reset only (non-latching)
- Automatic + manual reset at any time (non-latching)
- Latching (manual reset only)
- Latching with clear (manual reset only after alarm condition has cleared)
- Pump alternation control (automatic reset only)
- Sampling (activated for a user-specified time)
- User selectable fail-safe operation
- Time delay (on and off), independent for each relay
- Manual control mode
- Interlock relay mode

Analog Output

The isolated analog retransmission signal can be configured to represent the process variable (PV), maximum (peak) value, minimum (valley) value, the value for any of the eight relay set points, or Modbus input. While the output is nominally 4-20 mA, the signal will accurately accommodate under- and over-ranges from 1 to 23 mA.

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.

APPLICATION

Load Cell

A typical application for load cells is in a tank weighing operation. In the following example, this three-legged tank has a load cell under each leg. The three load cells are wired locally in parallel within a junction box. The combined signals are then connected to the PD8-6100. During field calibration, the weight of the empty tank (zero point) and the full tank weight (full scale) are programmed into the meter. Over time, the tare feature on the PD8-6100 can account for obstacles like sludge buildup on the bottom of the tank when empty.
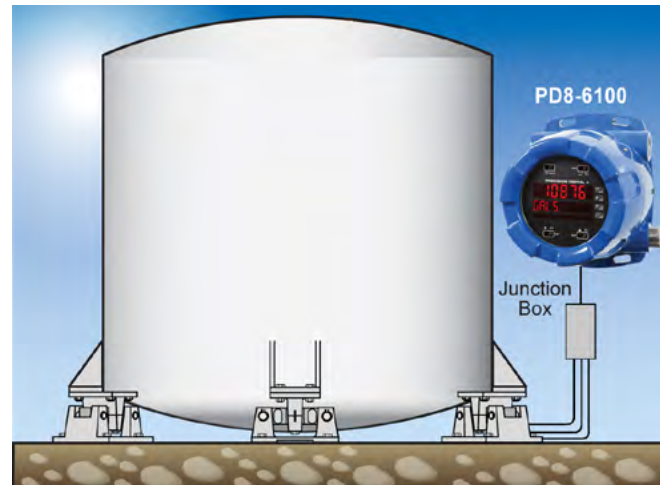
DIGITAL COMMUNICATIONS

Modbus® RTU Serial Communications

With onboard RS-485 serial communication, the PD8-6100 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 PD8-6100 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 ±40º; 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 conduit openings 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 assembles 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.
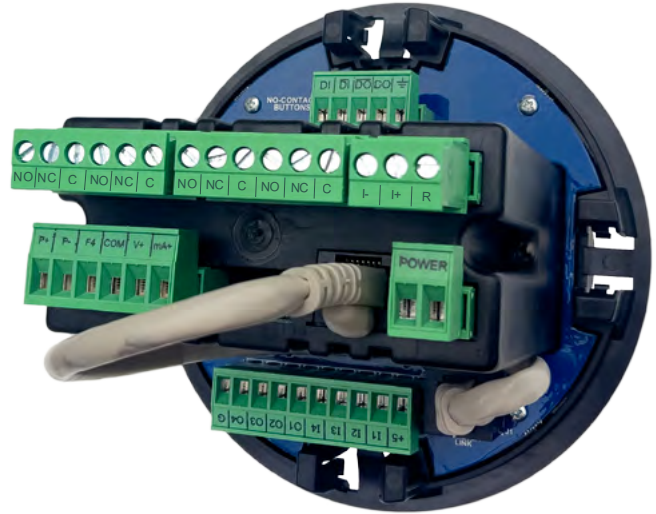
Note: The above photograph is representative of the back of the PD8-6100 in every regard except for the signal input connector.

USB Port 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:
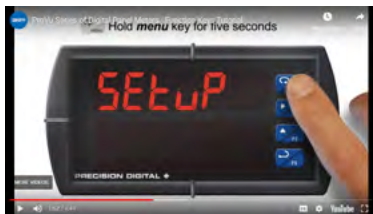

PROVU Series Overview

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.

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:


| Zero the Meter | Reset Tare | Tare the Display Value |

2. Built-in Digital Inputs/Outputs

The ProtEX-MAX comes with five digital inputs and four digital outputs. The digital inputs can 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 used to mimic the programming buttons, while the digital outputs can be used to send signals to PLCs and other devices.
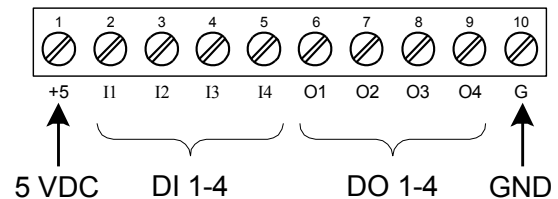
4 Digital Inputs & 4 Digital Outputs
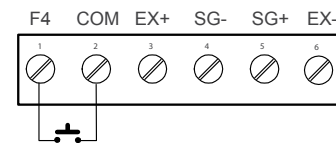
F4 Terminal for Digital Input

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
rSt Hi	Reset the stored maximum display value	FK, DI, DO
rSt Lo	Reset the stored minimum display value	FK, DI, DO
rSt HL	Reset the stored maximum & minimum display values	FK, DI, DO
tArE	Capture tare and zero the display	FK, DI, DO
rSt tr	Reset captured tare and resume normal operation	FK, DI, DO
rELAY	Directly access the relay menu	FK, DI
SEt 1*	Directly access the set point menu for relay 1 (*through 8)	FK, DI
rLY d	Disable all relays until a button assigned to enable relays (rLY E) is pressed	FK, DI
rLY E	Enable all relays to function as they have been programmed	FK, DI
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
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
Ln1 Hi	Display maximum display value on line 1	FK, DI
Ln1 Lo	Display minimum display value on line 1	FK, DI
Ln1 HL	Display maximum & minimum display values on line 1	FK, DI

Display	Description	Item
Ln2 mV	Display the mV input on line 2	FK, DI
Ln2 Hi	Display maximum display value on line 2	FK, DI
Ln2 Lo	Display minimum display value on line 2	FK, DI
Ln2 HL	Display maximum & minimum display values on line 2	FK, DI
ZEro	Zero the display *(this is different from capture tare because it cannot be reset)*	FK, DI
F On 1*	Force relay 1 (*through 4) into the on state. This is used in conjunction with a digital input expansion module to achieve interlock functionality.	FK, DI
ContrL	Directly access the Manual Control menu	FK, DI
diSAbL	Disable the selected function key or digital I/O	FK, DI
AcK	Acknowledge all active relays that are in a manual operation mode such as auto-manual or latching	FK, DI, DO
rESEt	Directly access the reset menu	FK, DI
mEnu	Mimic the menu button functionality (digital inputs only)	DI
riGHt	Mimic the right arrow/F1 button functionality (digital inputs only)	DI
uP	Mimic the up arrow/F2 button functionality (digital inputs only)	DI
EntEr	Mimic the enter/F3 button functionality (digital inputs only)	DI
ALm 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.

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)

IECEx

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!

EXPLOSION-PROOF
ProtEX-MAX Series

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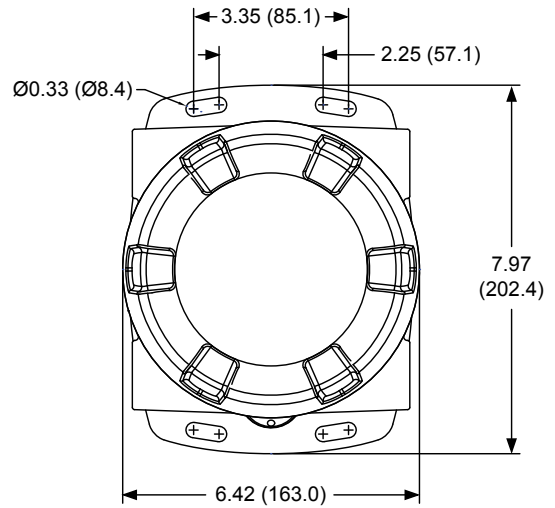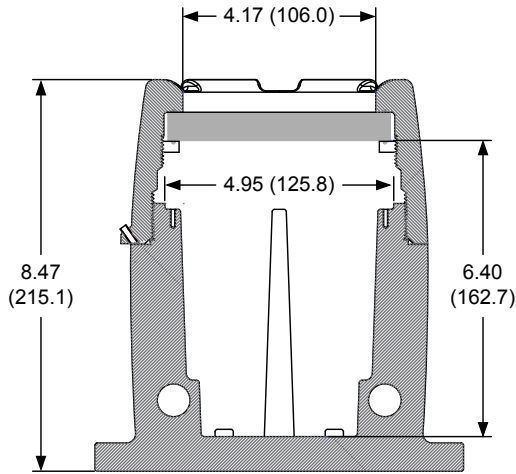- Operating Temperature of -55 to 65°C
- Worldwide Approvals

PANEL METERS
ProVu Series

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

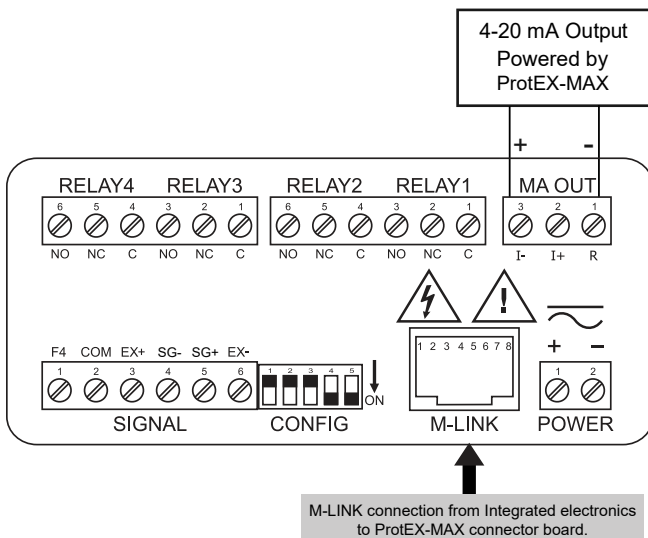Go to PREDIG.COM for details on ProVu, ProtEX-MAX and Helios Series Meters

DIMENSIONS

4.17 (106.0)

4.95 (125.8)

8.47 (215.1)

6.40 (162.7)

3.35 (85.1)

2.25 (57.1)

Ø0.33 (Ø8.4)

7.97 (202.4)

6.42 (163.0)

CAD ENCLOSURE DIMENSIONAL DRAWINGS

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

predig.com/documentation-cad

CONNECTIONS

4-20 mA Output Powered by ProtEX-MAX

+   −

RELAY4   RELAY3   RELAY2   RELAY1   MA OUT

6 5 4 3 2 1   6 5 4 3 2 1   3 2 1

NO NC C NO NC C   NO NC C NO NC C   I- I+ R

F4 COM EX+ SG- SG+ EX-   1 2 3 4 5 ON   1 2 3 4 5 6 7 8   + −

1 2 3 4 5 6   1 2

SIGNAL   CONFIG   M-LINK   POWER

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

Connections for PD8-6100-6H7 & PD8-6100-7H7
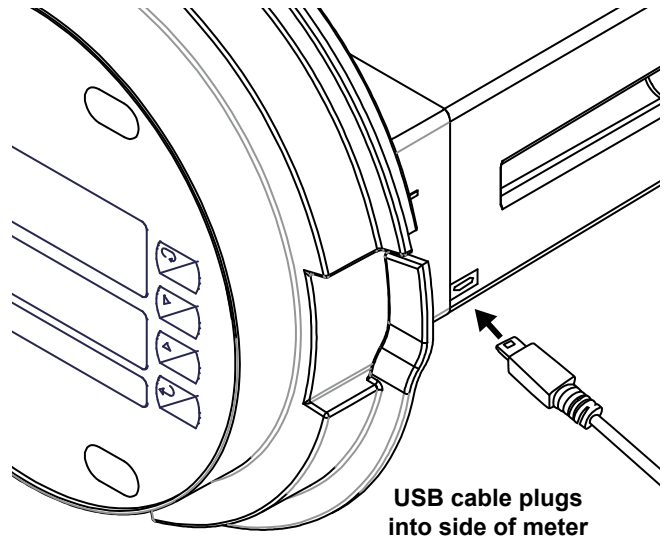
USB cable plugs into side of meter

DI   D̄Ī   D̄Ō   DO   ⏚

1 2 3 4 5

RS-485 Connections

1 2 3 4 5 6 7 8 9 10

+5 I1 I2 I3 I4 O1 O2 O3 O4 G

5 VDC   DI 1-4   DO 1-4   GND
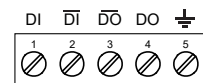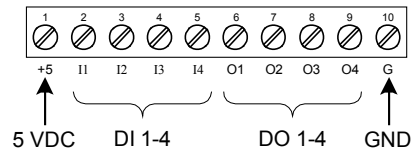
Digital I/O Connections

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 value is six.
Display Update Rate	5/second (200 ms)
Overrange	Display flashes 999999
Underrange	Display flashes -99999
Display Assignment	Display Line 1: PV1, PV2, PCT, max & min, set points, PV & units, net & gross weight, Modbus input, millivolts.
	Display line 2: Same as Display Line 1; plus units, tag or turned off.
Units	Predefined: lb, kg, ounce, gram, ton, metric ton (tonne); and custom units.
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 cycled.
Rounding	Select 1, 2, 5, 10, 20, 50, or 100 (e.g. rounding = 10, value = 123.45, display = 123.50).
Tare	There are three modes of tare operation: Capture Tare, Programmable Tare, and Off.
Password	Three programmable passwords restrict modification of programmed 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.
Non-Volatile Memory	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-to-power line 500 V input-to-output (powered by external 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	Power, signal, relays, mA out terminals: 5 lb-in (0.56 Nm)
	Digital I/O and RS-485: 2.2 lb-in (0.25 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.

Strain Gauge Input

Inputs	Field selectable: 0-15 mV, 0-30 mV, 0-150 mV, 0-300 mV, ±15 mV, ±25 mV, ±150 mV, ±250 mV, or Modbus PV (Slave)
Isolated Sensor Power Supply	Terminals EX+ & EX-: 10 VDC or 5 VDC ± 10%, rated @ 25 mA max.
	Note: Do not use 24 VDC to power strain gauge bridge.
Accuracy	±0.03% of calibrated span ±1 count
Minimum Load Resistance	14 Ω @ 5 V 28 Ω @ 10 V
Maximum Excitation Current	25 mA @ 5 V or 10 V
Temperature Drift	0.002% of calibrated span/°C max from 0 to 65°C ambient, 0.005% of calibrated span/°C max from -30 to 0°C ambient
Functions	Linear with multi-point linearization
Multi-Point Linearization	2 to 32 points for PV or PV1 2 to 8 points for PV2 (Dual-scale feature)
Low 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 dddddd

Calibration Range

Input Range	Minimum Span Input 1 & 2
15 mV	0.2 mV
25 mV, 30 mV	0.4 mV
150 mV	2.0 mV
250 mV, 300 mV	4.0 mV

An Error message will appear if the input 1 and input 2 signals are too close together.

Input Impedance	Strain Gauge Bridge: Greater than 10 MΩ mV Source: 200 kΩ

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.
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	• 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, 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	Process variable (PV), max, min, set points 1-4, Modbus input, or manual control mode
Scaling Range	1.000 to 23.000 mA for any display range
Calibration	Factory calibrated: 0.00 to 100.00 = 4-20 mA output
Analog Out Programming	1.000 mA minimum and 23.000 mA maximum for all parameters: overrange, underrange, max, min, and break
Accuracy	± 0.1% of span ± 0.004 mA
Temperature Drift	0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°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 ± 10% isolated from the input at >500 V. Used to power the 4-20 mA output. All models @ 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	Operate tare function, 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

MeterView Pro Software

Availability	Download directly from meter or from www.predig.com/software
System Requirements	Microsoft® Windows® XP/Vista/7/8/10, USB 2.0 (for programming only)
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 ¾" 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	II 2 G D Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate No.: Sira 19ATEX1252U
IECEx	Ex db IIC Gb Ex tb IIIC Db IP66/IP68 Tamb: -55°C to +85°C Certificate No.: 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 No.: 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 PD8-6100 • Aluminum Enclosure		
85-265 VAC Model	**12-24 VDC Model**	**Options Installed**
PD8-6100-6H0	PD8-6100-7H0	None
PD8-6100-6H7	PD8-6100-7H7	4 Relays & 4-20 mA Output
Note: 24 V Transmitter power supply standard on all models.		

ProtEX-MAX PD8-6100 • Stainless Steel Enclosure		
85-265 VAC Model	**12-24 VDC Model**	**Options Installed**
PD8-6100-6H0-SS	PD8-6100-7H0-SS	None
PD8-6100-6H7-SS	PD8-6100-7H7-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**

Disclaimer

LDS8-6100_I   12/23

PRECISION DIGITAL CORPORATION

233 South Street • Hopkinton MA 01748 USA • Tel (800) 343-1001

PRECISION DIGITAL

www.predig.com