PD6907 Hazardous Area Loop-Powered F&I Meter
Quick Start Guide

ProtEX+

CSA • Ex • IECEx • CE

PRECISION DIGITAL

This quick start guide briefly describes some of the common setup procedures for this meter. The meter is programmed using four easy to access front panel buttons.

For additional information about this meter not covered in this quick start guide, please consult the instruction manual available at www.predig.com.

Front Panel Buttons Operation

Button Symbol	Description
MENU	Press to enter or exit Programming Mode, view settings, or exit max/min readings
F1 RESET	Press to display max/min readings.
F2 MAX	Press to reset max/min readings.
F3 ENTER	Press to acknowledge all manually resettable relays or open collectors. Press to lock/unlock the display value after pressing the F1 key.

⚠ CAUTION
- Read complete instructions prior to installation and operation of the meter.
- Avoid touching more than one button at a time, otherwise the buttons become unresponsive and enter into a self-calibrating routine. This is indicated by the flashing hand symbol:

⚠ WARNINGS
- This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at his/her own risk. Precision Digital Corporation shall not be held liable for damages resulting from such improper use.
- Failure to follow installation guidelines could result in death or serious injury. Make sure only qualified personnel perform the installation.
- For Explosion-Proof / Dust-Ignition Proof / Flame-Proof applications, never remove the meter cover in explosive environments when the circuit is live.
- Cover must be fully engaged to meet for Explosion-Proof / Dust-Ignition Proof / Flame-Proof requirements.
- Hazardous voltages exist within enclosure. Installation and service should be performed only by trained service personnel.
- Service requiring replacement of internal components must be performed at the factory.
- Control room equipment must not use or generate more than 250 VRMS or VDC.
- Hazardous location installation instructions for associated apparatus (barrier) must be followed when installing this equipment.
- For safe installation of an ATEX approved transmitter in series with PD6907 loop-powered feet & inches meters, the hazardous location installation instructions for the transmitter, PD6907 loop-powered feet & inches meter, and associated apparatus (barrier) must be compatible.
- PD6907 loop-powered feet & inches meters do not add capacitance or inductance to the loop under normal or fault conditions.
- Substitution of components may impair hazardous location safety.
- Equipment contains non-metallic materials and therefore special care and consideration should be made to the performance of these materials with respect to chemicals which may be present in a hazardous environment.

⚠ WARNING
Cancer and Reproductive Harm
www.P65Warnings.ca.gov

Program Meter with MeterView XL Software

The fastest and easiest way to program the meter is using the free Meterview XL programming software. This software greatly simplifies the programming process and allows the user to save configuration files for later use.

The meter connects to the PC via a provided micro-USB cable and is powered by the USB connection, so no additional power is needed during programming.

To download the latest MeterView XL programming software and manual, please visit predig.com/meterviewxl.

⚠ WARNING
- The meter should only be connected to a computer while it is located in a safe area.

⚠ CAUTION
- Care should be exercised to avoid ground loops when connecting the USB to an active loop (e.g. power supply, transmitter, loop-powered meter, etc.). It is recommended to connect the (mA+) terminal of the meter to the (-) terminal of a two-wire transmitter and the (mA-) to the (+) of the next device in the loop or to the (-) terminal of the power supply.

Connections

To access the connectors, remove the enclosure cover and unclip the display module by pulling it from the enclosure. Signal, backlight, open collector, and digital input connections are made to removable connectors on the display module. Relays and 4-20 mA output connections (if installed) are made to removable connectors in the base of the enclosure. The display module may be disconnected from the options module to facilitate wiring to the options module. Grounding connections are made to the two ground screws provided on the base of the enclosure, one internal and one external.

⚠ WARNING
- Observe all safety regulations. Electrical wiring should be performed in accordance with all agency requirements and applicable national, state, and local codes to prevent damage to the meter and ensure personnel safety.
- Static electricity can damage sensitive components.
- Observe safe handling precautions for static-sensitive components.
- Use proper grounding procedures/codes.
- If the meter is installed in a high voltage environment and a fault or installation error occurs, high voltage may be present on any lead or terminal.
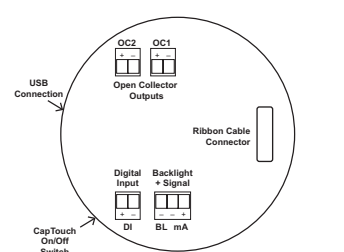
Connectors Labeling

Figure 4. Connector Labeling for PD6907-HA-##-LNN

Installation

To access the connectors, remove the enclosure cover and unclip the display module by pulling it from the enclosure. The display module may be disconnected from the options module to facilitate wiring to the options module.

Refer to Control Drawing (DW2636 - Contained within the LIM6907-2) for details related to intrinsically safe field wiring.

⚠ WARNING
Explosion-Proof / Dust-Ignition Proof / Flame-Proof
- Disconnect from supply before opening enclosure. Keep cover tight while circuits are live. Conduit seals must be installed within 18" (450mm) of the enclosure.

Unpacking

Remove the meter from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier. If any part is missing or the meter malfunctions, please contact your supplier or the factory for assistance.

Mounting

The meter has a slotted mounting flange that may be used for pipe mounting or wall mounting. Alternatively, the unit may be supported by the conduit using the conduit holes provided. Refer to Figure 1 and Figure 2.

⚠ WARNING
- Do not attempt to loosen or remove flange bolts while the meter is in service.

Cover Jam Screw

The cover jam screw should be properly installed once the meter has been wired and tested in a safe environment. The cover jam screw is intended to prevent the removal of the meter cover in a hazardous environment without the use of tools. Using a M2 hex wrench, turn the screw clockwise until the screw contacts the enclosure base. Turn the screw an additional ¼ to ½ turn to secure the cover.

⚠ CAUTION
- Excess torque may damage the threads, screw head, and wrench.

Dimensions
All units: inches (mm)
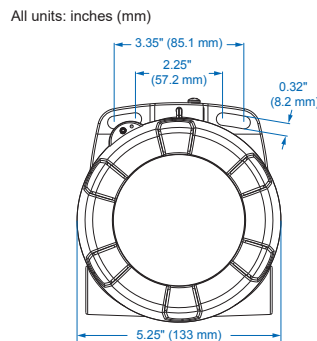
Figure 1. Enclosure Dimensions - Front View
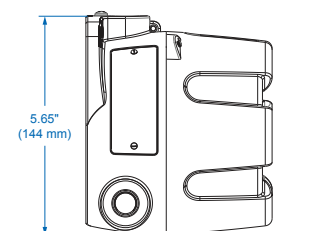
Figure 2. Enclosure Dimensions - Side View
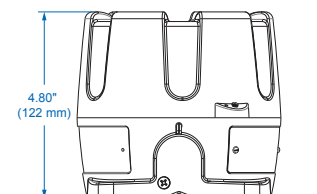
Figure 3. Enclosure Dimensions - Top View

CAD
Download free 3-D CAD files of these instruments to simplify your drawings!
predig.com/documentation-cad

Figure 5. Connector Labeling for PD6907-HA-##-L2N

Figure 6. Connector Labeling for PD6907-HA-##-L3N

Figure 7. Connector Labeling for PD6907-HA-##-L5N

Wiring Diagrams

⚠ IMPORTANT
- Refer to Control Drawing (DW2636 - Contained within the LIM6907-2) for details related to intrinsically safe field wiring.

Current Loop (4-20) mA Connections

Signal connections are made to a three-terminal connector (see *Connectors Labeling*). The meter and the backlight are powered by the 4-20 mA current loop.

There are no switches or jumpers to set up for the input. Setup and programming are performed through the CapTouch buttons or PC-based software.
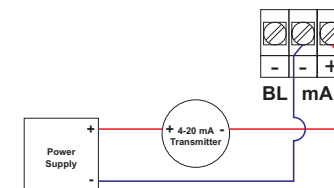
Figure 8. 4-20 mA Input Connection without Backlight
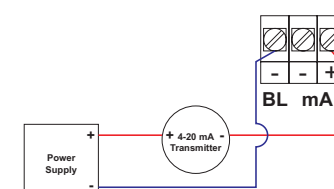
Figure 9. 4-20 mA Input Connection with Backlight

The current input is protected against current overload up to 1 amp. The display may or may not show a fault condition depending on the nature of the overload.

Digital Input Connections

A digital input is standard on the meter. This digital input is connected with a normally open contact across DI+ and DI-, or with an active low signal applied to DI+ and DI-.
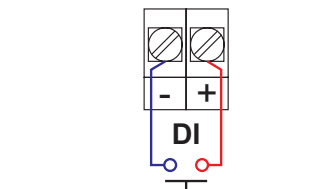
Figure 10. Digital Input Connections

4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled 4-20 mA Output on Figures 6 and 7. The 4-20 mA output must be powered from an external power supply.
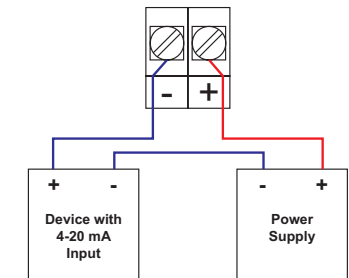
Solid-State Relay Connections

Relay connections are made to two-terminal connectors. Each relay's C terminal is common only to the normally open (NO) contact of the corresponding relay.
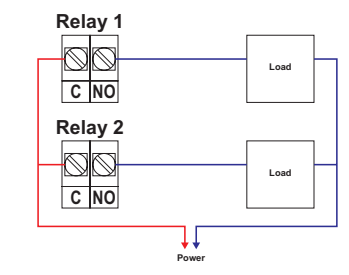
Open Collector Output Connections

Open collector output 1 and 2 connections are made to terminals labeled OC1 and OC2. Connect the alarm or pulse input device as shown below.
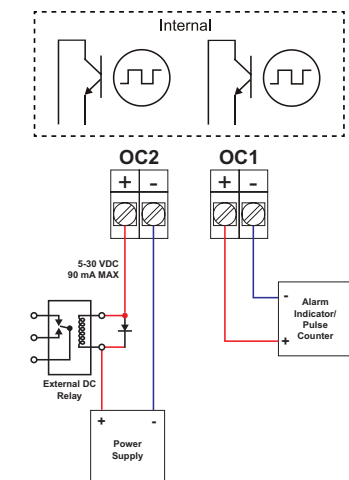
Setup and Programming

The meter is factory calibrated prior to shipment to display 0.00 to 100.00, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.

Overview

There are no jumpers to set; setup and programming is done through the CapTouch buttons or the free MeterView XL PC based software.

The meter may be powered via the micro-USB connection located on the display module for the purpose of programming only. The backlight will not work while the meter is powered via the USB connection.

⚠ IMPORTANT
- CapTouch buttons will not work if two or more buttons are detected as being pressed simultaneously. Be careful to avoid triggering multiple buttons or reaching across one button location to press another.

CapTouch Buttons

The meter is equipped with four capacitive sensors that operate as through-glass buttons so that it can be programmed and operated without removing the cover.

These buttons can be turned off for security by selecting the *Off* setting on the switch located on the side of the display module, close to the Menu button.

To actuate a button, press one finger to the window directly over the marked button area. When the cover is removed, the CapTouch buttons can be used after the meter completes a self-calibrating routine (hand symbol flashes). The sensors are disabled when more than one button is pressed, and they will automatically re-enable after a few seconds (hand symbol off).

Buttons and Display

MENU	RIGHT/F1	UP/F2	ENTER/F3
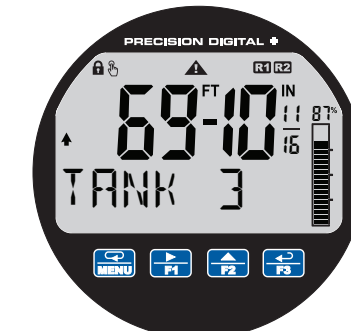
Main Menu

The main menu consists of all the meter's programmable functions: *Input, Output, Advanced,* and *Display*.

- Press *Menu* button to enter *Programming Mode* then press the *Right-Arrow* button to move forward through the menu and the *Up-Arrow* button to move back.
- Press *Menu* at any time to go back one level or press & hold to exit and return to *Run Mode*. Changes made to settings prior to pressing *Enter* are not saved.
- Changes to the settings are saved to memory only after pressing *Enter/F3* to confirm the setting or pressing *Enter/F3* at the *SAVE?* screen when available.

Scaling the 4-20 mA Input

It is **very important** to read the following information before proceeding to program the meter:

- The meter is factory calibrated prior to shipment to display 0.00 to 100.00 FT, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.
- A calibrated signal source is not needed to scale the meter.

Enter the *Input* menu to scale the meter to display the 4-20 mA input. The input can accept any signal from 4 to 20 mA.

Setting the Display Features

The meter's display functions may be programmed using the *Display* menu. This menu consists of the following submenus: *Units, Decimal Point, Comma, Bargraph, Top,* and *Bottom.*

Changing the Engineering Units

The *Units* menu is used to change how fractional inches are represented. The options are automatically reducing, 1/16, 1/8, 1/4, 1/2 of an inch, or no fractions. The default setting (FT-IN/X) automatically reduces the fraction to the lowest denominator.

When in dual-scale mode, it is possible to change the PV 2 display units within the selected unit class without the need to re-scale the meter. When selecting a new unit from within the *Display* menu (e.g. changing from gallons (GAL) to liters (L)), the meter will automatically convert the display values to display the new unit. Enter the *Units* menu, select a new unit of measure from the list of predefined units, and press the *Enter* button. If entering a custom unit (CUSTOM), the input must be scaled using the custom unit.

Reset Meter to Factory Defaults

When the parameters have been changed in a way that is difficult to determine what's happening, it might be better to start the setup process from the factory defaults. This can be accomplished using MeterView XL software or with the CapTouch buttons.

Instructions to load factory defaults:

1. Press the *Menu* button to enter *Programming Mode.*
2. Press the *Right-Arrow* button twice and press *Enter* to access the *Advanced* menu.
3. Press the *Up-Arrow* button and press *Enter* to access the *System* menu.
4. Press the *Right-Arrow* button and press *Enter* to access the *Default* menu.
5. Press *Enter* twice in quick succession. The meter will load default settings and restart.

Programming the Outputs

All models come with two open collectors. Depending on the model purchased, the meter may include two solid-state relays, and one 4-20 mA output. The *Output* menu will only show options for the available outputs.

Open Collector Outputs

The meter is equipped with two NPN open collector outputs as a standard feature that may be set up for pulse outputs, alarms, timed pulses, or disabled.

Pulse outputs can be set to transmit the PV value (PV1 or PV2 if meter is in dual-scale mode). Output 2 may be used to generate a quadrature output based on the other open collector output. An output test mode is also selectable to generate pulses at a constant programmable frequency.

Alarms are available based on the PV value or the digital input. The alarm status will show on the display even if the output is not wired.

A timer output (TIMER) turns the open collector on and off at the specified time intervals. The timer can be set as single-shot or continuous timer.

The stopwatch output (STPWATCH) allows the open collector to be manually activated by starting the stopwatch. The stopwatch count can be displayed on the top or bottom display.

The output may be disabled by selecting DISABLE.

The Open Collector Outputs are programmed in the following manner:

*Available for output 2 only

To program the meter for a PULSE Output, refer to the instruction manual found at predig.com.

Solid-State Relay Outputs

The meter can be optionally equipped with two solid-state relays that may be set up for alarms, timer, stopwatch, or pump control. Alternatively, they may be disabled.

Alarms are available based on the PV value or the digital input. The alarm status will show on the display even if the output is not wired. Pump control allows the relay to turn on and off a pump at specified on and off points. This can be done using only one of the relays to control one pump (ON-OFF) or using both relays in tandem to alternate between two pumps (ALTERN). A timer output (TIMER) turns the relay on and off at the specified time intervals. The timer can be set as single-shot or continuous timer. The stopwatch output (STPWATCH) allows the relay to be manually activated by starting the stopwatch. The stopwatch count can be displayed on the top or bottom display.

The output may be disabled by selecting DISABLE.

⚠ **CAUTION**
- During setup, the relays do not follow the input and they will remain in the state found prior to entering the *Relay* menu.

Isolated 4-20 mA Output

The *4-20 mA* menu is used to scale the isolated 4-20 mA output based on display values. This menu is not present on models without a 4-20 mA output option.

The 4-20 mA analog output can be scaled to provide a 4-20 mA signal for any PV display range or to simply retransmit the 4-20 mA input. The output may be disabled (DISABLE), and will only output the minimum signal. Overrange and underrange values determine what mA signal the meter will output if the mA input is underrange (<3.5 mA) or overrange (>20.5 mA). This value may be set to 1 mA, 3.5 mA, 3.8 mA, 20.5 mA, 20.8 mA, 23 mA, or disabled. No equipment is needed to scale the analog output; simply program two display values and corresponding mA output signals.

Enabling Password Protection

The *Password* menu is used for programming security to prevent unauthorized changes to the programmed parameter settings.

To set a password, enter the *Password* menu and program a five-digit password. When a password has been enabled, the lock icon 🔒 will display in the upper-left side of the display.

Advanced Features Menu

For features and capabilities not commonly used during setup, see the complete instruction manual found at www.predig.com for details on the *Advanced Features* menu.

Compliance Information

Hazardous Area Approvals

CSA	Explosion-proof for use in: Class I, Division 1, Groups B, C and D Dust-ignition proof for use in: Class II/III, Division 1, Groups E, F and G; T6 Flame-proof for use in: Zone 1, Ex d IIC T6 Ta = -55 to 75°C. Enclosure: Type 4X & IP66/IP68. Certificate number: CSA 11 2325749
ATEX	Intrinsically safe for use in: Ⓔ II 1 G D Ex ia IIC T4 Ga Ex ia IIIC T200°C Da Ta = -55 to 75°C Enclosure: Type 4X & IP66/IP68 Install per Control Drawing DW2636 (contained within LIM6928-2) Certificate number: CML 18ATEX2089X Explosion-proof for use in: Ⓔ II 2 G D Ex db IIC T6 Gb Ex tb IIIC T85°C Db IP68 Ta = -55 to 75°C Certificate number: Sira 10ATEX1116X
IECEx	Intrinsically safe for use in: Ex ia IIC T4 Ga Ex ia IIIC T200°C Da Ta = -55 to 75°C Enclosure: Type 4X & IP66/IP68 Install per Control Drawing DW2636 (contained within LIM6928-2) Certificate number: IECEx CML 18.0050X Explosion-proof for use in: Ex db IIC T6 Gb Ex tb IIIC T85°C Db IP68 Ta = -55 to 75°C Certificate number: IECEx SIR 10.0056X

ATEX/IECEx Special Conditions for Safe Use
The following conditions relate to safe installation and/or use of the equipment.

- The equipment loop/power port shall be connected to an intrinsically safe barrier with Uo ≤ 5.8V
- The 4-20 mA input port shall be connected to an intrinsically safe barrier with Uo ≥ 5.1V
- The PD6907-HA-AL enclosure is manufactured from aluminum. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered during installation, particularly if the equipment is installed in a Zone 0 location.
- All cable entries into the equipment shall be via cable glands or conduit which provide a minimum degree of protection of IP54.
- The equipment may not have 500V isolation between the circuit and earth. This shall be taken into account when installing the equipment.
- 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 buildup of electrostatic charges on non-conducting surfaces. Additionally, cleaning of the equipment should be done only with a damp cloth.
- Flameproof joints are not intended to be repaired.
- 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 PD69XX Series must be installed in accordance with the ATEX directive 2014/34/EU, the product certificates CML 18ATEX2089X, Sira 10ATEX1116X, IECEx CML 18.0050X, IECEx SIR 10.0056X and the product manual.

Electromagnetic Compatibility

EMC Emissions	• CFR 47 FCC Part 15 Subpart B Class A emissions requirements (USA) • ICES-003 Information Technology emissions requirements (Canada) • AS/NZS CISPR 11 Group 1 Class A ISM emissions requirements (Australia/New Zealand) • EN 55011 Group 1 Class A ISM emissions requirements (EU) • EN 61000-6-4 Emissions requirements for Heavy Industrial Environments - Generic
EMC Emissions and Immunity	EN 61326-1 EMC requirements for Electrical equipment for measurement, control, and laboratory use – industrial use

EU Declaration of Conformity

For shipments to the EU and UK, a Declaration of Conformity was printed and included with the product. For reference, a Declaration of Conformity is also available on our website at www.predig.com/docs.

Troubleshooting Tips

The rugged design and the user-friendly interface of the meter should make it unusual for the installer or operator to refer to this section of the manual. If the meter is not working as expected, refer to the recommendations below.

Symptom	Check/Action
No display at all	Check: 1. The 4-20 mA current loop is providing at least 3.5 mA to the meter. 2. The voltage drop of all devices connected to the 4-20 mA current loop does not exceed the max rating of the loop power supply.
Not able to change setup or programming, LOCKED is displayed	Meter is password-protected. Enter correct five-digit password to unlock or Master Password of 50865.
Meter display flashes: 1. 999FT 1 ᴵᴺ 2. -99FT 1 ᴵᴺ	Check that the number of digits required for the scaled value does not exceed the maximum digits for the display. If it does, try adjusting the decimal point location for less precision or changing the PV display to the bottom display.
Display is unstable	Check: 1. Input signal stability and value. 2. Display scaling vs. input signal. 3. Filter and bypass values (increase).
Display response is too slow	Check filter and bypass values
Display reading is not accurate	Check: 1. Input signal conditioner selected: Linear, square root, etc. 2. Scaling or calibration
Display does not respond to input changes, reading a fixed number	Check display assignment. It might be displaying max, min, or set point.
Display shows: 1. MAX and a number 2. MIN and a number	Press Menu to exit max/min display readings.
Relay operation is reversed	Check fail-safe settings in Output menu
Relays do not respond to signal	Check: 1. Relay action in Output menu 2. Set and reset points 3. Check manual control menu
If the display locks up or the meter does not respond at all	Cycle the power to reboot the microprocessor.
CapTouch buttons do not respond	1. If hand-symbol is flashing, multiple buttons were touched at the same time, wait a few seconds until the hand symbol goes off. 2. If Delayed mode has been set, press & hold any button for 5 seconds, the buttons should respond normally. 3. If the slide switch on the display module is in the Lock position, move the switch to the Unlock position.
Other symptoms not described above	Call Technical Support for assistance.