PD6620 Series Loop-Powered Flow Rate/Totalizers
Instruction Manual

Loop Leader Series

CE — **All Models**

⟨Ex⟩ **IECEx** — **PD6626 & PD6628 Only**

- 1/8 DIN Loop-Powered Flow Rate/Totalizers with NEMA 4X, IP65 Front
- 4-20 mA Input Displayed with ±0.02% Accuracy
- 1.5 Volt Drop (4.5 Volt Drop with Backlight)
- 0.7" (17.8 mm) 5 Alphanumeric Characters Top Display
- 0.4" (10.2 mm) 8 Alphanumeric Characters Bottom Display
- 8-Digit Total & Grand Total Display, Up to 13 Digits Using Both Lines
- Display Rate & Total Simultaneously
- Automatic or Manual Batch Control
- Display Open Channel Flow with Programmable Exponent Feature
- 32-Point Linearization & Square Root Extraction
- 20-Segment Bargraph with Numeric Percent Indication, Optional
- Shallow Depth Case Extends Only 3.6" (91 mm) Behind Panel
- (2) Open Collector Outputs Standard; Assigned to Pulse, Alarm, Timer, or Stopwatch
- (2) Optional Loop-Powered Solid State Relays; Assigned to Alarm, Sample, Timer, Batch, or Stopwatch
- Stopwatch & Timer Functions to Drive Relays & Open Collectors
- Optional Isolated 4-20 mA Analog Output
- Display Relay Runtime & Cycle Count via Relay Info Menu
- Free PC-Based MeterView XL USB Programming Software
- HART® Protocol Transparent
- Loop-Powered Backlight with Red Backlight for Alarm Conditions
- Safe Area Operating Temperature Range: -40 to 167°F (-40 to 75°C)
- Conformal Coated PCBs for Dust & Humidity Protection
- Password Protection
- UL & C-UL 61010 Listed for Electrical Safety
- UL & C-UL Listed as Intrinsically Safe and Nonincendive
- ATEX and IECEx Certified as Intrinsically Safe
- Wide Assortment of NEMA 4X Enclosures for up to Ten Meters
- Light / Horn & Reset Button Accessory
- Control Station Accessory for Remote Operation of Digital Input
- 3-Year Warranty

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Table of Contents

Table of Figures

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⚠ **CAUTION**

- Read complete instructions prior to installation and operation of the meter.

⚠ **WARNINGS**

- Risk of electric shock or personal injury.
- 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.

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

Limited Warranty

Precision Digital Corporation warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. Precision Digital's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

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Introduction

These loop-powered 1/8 DIN flow rate/totalizers can be installed virtually anywhere to provide convenient and informative display of flow rate and total from a 4-20 mA signal. One of the most convenient features of these instruments is their ability to display both flow rate and total at the same time. For instance, flow rate is typically displayed on the 5-digit alphanumeric top display and flow total or grand total is typically displayed on the 8-digit alphanumeric bottom display. Both display lines use 14-segment, alphanumeric characters for clear indication of tags, units, or alarm messages.

Further enhancing the display on these instruments is a 20-segment bargraph available on the PD6624 and PD6628 that also includes a numeric value of the percentage the bargraph represents.

These flow rate/totalizers can be installed virtually anywhere because they get their power from the 4-20 mA loop and therefore require no separate power source. And they only drop 1.5 V (4.5 V with backlight), so they add very little burden to the loop. Additional features that allow these instruments to be installed virtually anywhere include a NEMA 4X, IP65 front panel, an operating temperature range of -40 to 167°F (-40 to 75°C) (for safe area products), conformally coated PCBs, and a backlit LCD that can be read in bright sunlight or dimly lit areas. Finally, there are intrinsically safe and nonincendive versions of these instruments that can be installed in hazardous areas.

Free, PC-based, MeterView XL software that connects to the meter via a micro USB cable is available for programming and setup of the meters. For more details, see the LIM6622MVXL manual.

All models come equipped with two open collector outputs and a digital input. There are also models available with two solid state relays and isolated 4-20 mA analog output options. The open collector outputs are useful for alarm indication or pulse output. The digital input can be used to reset the total. The relays can be programmed for alarm indication, on/off control, or simple batch control.

Key Features

PD6624/28 Flow Rate/Totalizer with Bargraph

8-Digit Alphanumeric Bottom Line for Total, Grand Total, and Predefined or Custom Units

8-Digit Total includes Commas for Easier Reading

Showing Red Backlight for Alarm Indication

Five (5) 0.7" Large Digits on Top Line for Rate

NEMA 4X, IP65 Front

Bargraph Numeric Percent Indication

Front Panel Buttons for Setup, Programming, and Operation

Bargraph for Visual Representation of Rate or Total Percentage

Informative Display

These loop-powered 1/8 DIN flow rate/totalizers can be installed virtually anywhere to provide convenient and informative display of flow rate and total from a 4-20 mA signal. One of the most convenient features of these instruments is their ability to display both flow rate and total at the same time. For instance, flow rate is typically displayed on the 5-digit alphanumeric top line and flow total or grand total is typically displayed on the 8-digit alphanumeric bottom line. Both of these lines use 14-segment, alphanumeric characters for clear indication of tags, units or alarm messages.

A 20-segment bargraph is also available on the PD6624/28 that also includes a numeric value of the percentage the bargraph represents.

Alarm Indication

When an alarm occurs, the Loop Leader's display can be programmed to turn red. It may also be set up to flash an alarm message along with the process variable. The flashing red alarm message can be activated even if no relay or open collector is connected.

Display Flow Rate & Total at Same Time

One of the key features of the Loop Leader Flow Rate/Totalizers is their ability to display flow rate and total at the same time. In addition, the meter can toggle between the rate and total and their corresponding units as the following example illustrates.
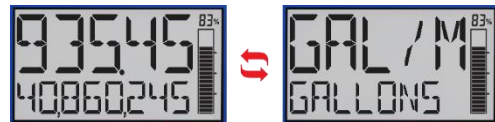
Dual-Scale Feature

Users can use the dual-scale feature to display the input in two different scales. For instance, the example below shows an application where the Loop Leader displays the input in gallons per minute and cubic feet per minute.
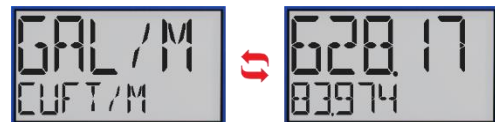
14 Segment Characters

Notice how much better letters like "T", "N" and "K" appear as 14-segment characters on the Loop Leader vs 7-segment characters found on many other meters.

6

Commas on 8-Digit Totalizer for Easy Reading

It may seem like a simple thing, but adding commas to an eight-digit number makes it easier to read:

Predefined and Custom Units

The meter has six available preprogrammed unit classes: volume, height, temperature, pressure, weight, and rate. When the desired unit class or unit of measure within a class is not available, a custom unit may be programmed.

Password Protection

There are three password types available: Main, Total, and Grand Total. The Main password prevents access to the meter Programming Mode. Total and Grand Total passwords prevent resetting the total and grand total, respectively.

Multiple Outputs

- Two open collector outputs (standard)
- Two solid state relays (optional)
- One 4-20 mA output (optional)

The open collector outputs and relays generally operate in the same manner, with the major exception being the open collectors are not available for pump alternation and the relays are not available with pulse features. The open collectors and relays can be controlled either automatically or manually.

The isolated analog output signal can be configured to represent the process variable (PV1, PV2, or retransmit). It can also be reverse scaled such that the meter's high calibration value outputs 4 mA and the meter's low calibration outputs 20 mA.

Input Signal Conditioning Functions (FUNCTION)

The *Function* menu is used to select the input signal conditioner applied to the input: linear, square root, programmable exponent, or round horizontal tank volume calculation. Multi-point linearization is part of the linear function selection.

Meters are set up at the factory for linear function with 2-point linearization. The linear function provides a display that is linear with respect to the input signal.

Square Root Linearization (SQROOT)

The square root function can be used to linearize the signal from a differential pressure transmitter and display flow rate in engineering units.

PD6622 Displaying Flow Rate by Applying the Square Root Function to the Output of a DP Transmitter.

Programmable Exponent Linearization (EXPONENT)

The programmable exponent can be used to linearize the signal from level transmitters in open-channel flow applications using weirs and flumes.
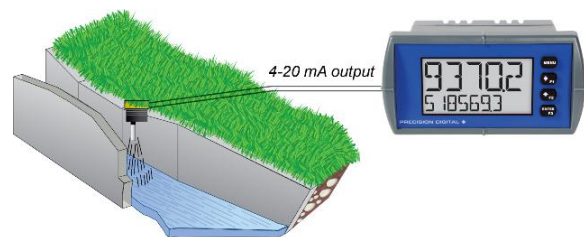
The PD6622, in combination with an ultrasonic level transmitter, makes for an economical way to measure and display open channel flow rate in most weirs and flumes. A guide such as the ISCO Open Channel Flow Measurement Handbook can provide the user with all the information needed: the exponent used in the flow equation for the desired flow units and the flow rate for any given head height. For example, to display the open channel flow rate from a 3" Parshall flume, the ISCO handbook advises the exponent is 1.547 and at the maximum head height of 3.0 feet, the flow rate is 3.508 MGD.

Ordering Information

General Purpose Instruments

Loop Leader PD6622 • Standard Decimal Models – General Purpose	
Model	**Description**
PD6622–LNN	Loop-Powered, General Purpose, No Options
PD6622–L2N	Loop-Powered, General Purpose, Two Solid State Relays
PD6622–L3N	Loop-Powered, General Purpose, 4-20 mA Analog Output
PD6622–L5N	Loop-Powered, General Purpose, Two Solid State Relays and 4-20 mA Analog Output

Loop Leader PD6624 • Bargraph Models – General Purpose	
Model	**Description**
PD6624–LNN	Loop-Powered, General Purpose, Bargraph, No Options
PD6624–L2N	Loop-Powered, General Purpose, Bargraph, Two Solid State Relays
PD6624–L3N	Loop-Powered, General Purpose, Bargraph, 4-20 mA Analog Output
PD6624–L5N	Loop-Powered, General Purpose, Bargraph, Two Solid State Relays and 4-20 mA Analog Output

Hazardous Area Instruments

Loop Leader PD6626 • Standard Decimal Models – Hazardous Area	
Model	**Description**
PD6626–LNN	Loop-Powered, Hazardous Area, No Options
PD6626–L2N	Loop-Powered, Hazardous Area, Two Solid State Relays
PD6626–L3N	Loop-Powered, Hazardous Area, 4-20 mA Analog Output
PD6626–L5N	Loop-Powered, Hazardous Area, Two Solid State Relays and 4-20 mA Analog Output

Loop Leader PD6628 • Bargraph Models – Hazardous Area	
Model	**Description**
PD6628–LNN	Loop-Powered, Hazardous Area, Bargraph, No Options
PD6628–L2N	Loop-Powered, Hazardous Area, Bargraph, Two Solid State Relays
PD6628–L3N	Loop-Powered, Hazardous Area, Bargraph, 4-20 mA Analog Output
PD6628–L5N	Loop-Powered, Hazardous Area, Bargraph, Two Solid State Relays and 4-20 mA Analog Output

Note: All models come with two open collector outputs and one digital input standard.

Enclosures

Series	# of Meters	Description
PDA2300	1 – 10	Plastic NEMA 4X: Hinged Cover, Clasp Closure, Meters Mount in Cover
PDA2600	1 – 6	Stainless Steel NEMA 4X: Hinged Cover, Screw Closure, Meters Mount in Cover
PDA2700	1 – 6	Painted Steel NEMA 4: Hinged Cover, Screw Closure, Meters Mount in Cover
PDA2800	1 – 2	Plastic NEMA 4X: Screwed Down Cover, Meters Mount in Cover
PDA3400	1 – 3	Plastic NEMA 4X: Screw Down Cover, Meters Mount Behind Cover

Need help selecting the right enclosure? Go to www.predig.com/esu

Accessories

Model	Description
PD9501	Multi-Function Calibrator
PD9502	Low-Cost Signal Generator
PDA1024-01	24 VDC Transmitter Power Supply for DIN Rail
PD659	Signal Isolators, Splitters, and Conditioners
PDA-LH	Light/Horn Accessory, See website for Available Colors
MOD-LH	Light/Horn/Enclosure Modification, See website for Available Colors
PDA2360	Plastic Control Stations
PDA-BUTTON	Momentary Pushbutton

PDA2360 Plastic Control Stations

Model	Description
PDA2360-E	Emergency Button
PDA2361-A	Ack Button
PDA2361-B	Blank Button
PDA2361-R	Reset Button
PDA2361-T	Tare Button
PDA2361-S	Stop Button
PDA2361-Q	Silence Button

Notes:

1. These control stations 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.
2. Control stations can be connected directly to the meter's Digital Input terminals labeled DI+ and DI-. See *Remote Operation of Meter* on page *21* for details.

Light / Horn & Button Accessories

Model	Description
MOD-LHRB1	Red Light / Horn and Reset Button with Holes Drilled in Enclosure[1]
MOD-LHGB1	Green Light / Horn and Reset Button with Holes Drilled in Enclosure[1]
MOD-LHYB1	Yellow Light / Horn and Reset Button with Holes Drilled in Enclosure[1]
MOD-LHBB1	Blue Light / Horn and Reset Button with Holes Drilled in Enclosure[1]
MOD-LHWB1	White Light / Horn and Reset Button with Holes Drilled in Enclosure[1]

Note:

1. This MOD supplies the Light / Horn and Reset Button. The enclosure comes pre-drilled with holes for Light / Horn and Reset Button and the user performs the installation and wiring. Meter and enclosure are sold separately. The Light / Horn hole is in the back left corner of the enclosure and the Reset Button is centered on the cover of the enclosure below the meter about an inch off the bottom of the cover except on the PDA3400 series where it is mounted on the side of the enclosure.

Signal Splitter & Conditioner Accessories

Model	Description
PD659-1MA-1MA	Signal Isolator with One 4-20 mA Input and One 4-20 mA Output
PD659-1MA-2MA	Signal Splitter with One 4-20 mA Input and Two 4-20 mA Outputs
PD659-1V-1MA	Signal Conditioner with One 0-10 VDC Input and One 4-20 mA Output
PD659-1MA-1V	Signal Conditioner with One 4-20 mA Input and One 0-10 VDC Output

Note:

These signal splitters and conditioners 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.

PDA6420 Split Core AC Current Transducer

Model	Description
PDA6420	Input: 30/60/120 AAC; Output: 4-20 mA

Note:

These split core transducers 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.

Each Light / Horn accessory comes with 9 labels for the button.

Useful Tools

PD9501 Multi-Function Calibrator

This PD9501 Multi-Function Calibrator has a variety of signal measurement and output functions, including voltage, current, thermocouple, and RTD.

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.

Specifications

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

Display

Display	Dual-line LCD with backlight. Both lines 14-segment alphanumeric. Top: 0.7" (17.8 mm), Bottom: 0.4" (10.2 mm). Display may be programmed to turn red and flash a user-defined message on alarm condition.
Backlight	Powered by 4-20 mA loop Intensity varies with signal level
Top Display	5 digits (-9999 to 99999) or 5 characters (all capital & most lower-case letters)
Bottom Display	8 digits (-9,999,999 to 99,999,999; separated by commas) or 8 characters (all capital & most lower-case letters)
Bargraph	20 segments, numeric percent indication at top (PD6624 & PD6628 only)
Decimal Point	Up to four decimal places on top display and up to seven decimal places on bottom display
Commas	Commas to indicate 1000s (e.g. 88,987,628) on bottom display
Dual-Scale Feature	The input can be displayed in different scales on the top and bottom displays. For instance, the top display could display the flow in GPM and the bottom display could display that same input in CFM.
Alarm Indication	Red backlight, flashing display, alarm symbol (!); Symbols are not available on bargraph models. Bargraph segment flashes on alarm.
Alarm Message	On or Off; user programmable, 8 characters maximum. Displayed every 10 seconds for 1 second on bottom display.
Display Update Rate	Ambient > -10°C: 1 Update/Second Ambient = -20°C: 1 Update/2 Seconds From -20°C to -40°C the update rate slows down 1 second for every -2°C (e.g. at -24°C, 1 update/4 seconds).
Overrange	Top: 99999; Bottom: 99,999,999 (flashing)
Underrange	Top: -9999; Bottom: -9,999,999 (flashing)

General

Programming Method	Front panel & Free PC-based USB programming software
Enclosure & Materials	Enclosure: 1/8 DIN, IP65, NEMA 4X front panel, high impact plastic, NORYL® polyphenylene ether & polystyrene blend (PPE PS) resin, UL 94V-0, Color: gray Gasket: silicone rubber Faceplate: LEXAN® polycarbonate (PC) Film Buttons: silicone rubber
Environmental	*Operating temperature range:* -40 to 75°C for safe area products -40 to 70°C for hazardous area products *Storage temperature range:* -40 to 85°C *Relative humidity:* 0 to 90% non-condensing; Printed circuit boards are conformally coated.

Noise Filter	Averages the input signal over a period of time between 1 and 16 seconds to dampen the effects of a noisy signal that causes a jumpy display.
Filter Bypass	0.0 to 99.9% of full scale. Input signal changes greater than bypass value are displayed immediately.
Recalibration	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.
Password	There are three password types available: Main, Total, and Grand Total. The Main password prevents access to the meter Programming Mode. Total and Grand Total passwords prevent resetting the total and grand total, respectively.
Non-Volatile Memory	All programmed settings and total and grand total values are stored in non-volatile memory for a minimum of ten years if power is lost.
Normal Mode Rejection	64 dB at 50/60 Hz
Connections	Removable screw terminals accept 12 to 22 AWG wire
Tightening Torque	*Screw terminal connectors:* 4.5 lb-in (0.5 Nm) *Mounting screws:* 8.0 lb-in max. (0.9 Nm)
Overall Dimensions	4.68" x 2.45" x 3.79" (119 mm x 62 mm x 96 mm) (W x H x D)
Weight	8.7 oz (247g) with option board
Warranty	3 years parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

Input

Input	4-20 mA
Accuracy	±0.02% of span ±1 count, Square root and programmable exponent: 10-100% FS
Voltage Drop	Without Backlight: 1.5 V maximum, With backlight: 4.5 V maximum
Equivalent Resistance	With backlight off: 75 Ω @ 20 mA With backlight on: 225 Ω @ 20 mA
Input Overload	Over current protection to 1 A maximum Over voltage protection to 30 VDC max (between mA+ and mA-/BL-)
Temperature Drift	25 PPM/°C from -40 to 75°C ambient
Function	Linear (2-32 points), square root, or programmable exponent PV2: Linear (2-32 points) or round horizontal tank (If total is disabled and PV2 is enabled)
Low-Flow Cutoff	0.1 to 999,999 or disable. Point below at which the display always shows zero.
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	Top display: -9999 to 99999; Bottom display: -9,999,999 to 99,999,999 (with commas)
Total & Grand Total Display	Top display: 0 to 99999; Bottom display: 0 to 99,999,999 (with commas)
13-Digit Total & Grand Total	Up to 9,999,999,999,999 using both lines with 13-digit total feature enabled.
Total & Grand Total Indication	On bottom display, "T" indicates total and "GT" indicates grand total (not available on bargraph models)
Total Decimal Point	Up to four decimal places on top, up to seven decimal places on bottom. Total decimal point is independent of rate decimal point.
Totalizer	Calculates total based on rate and rate units to display total in engineering units. A custom factor must be programmed if using custom defined units.
Time Base	Seconds, Minutes, Hours, Days
Totalizer Rollover	Totalizer rolls over when display exceeds 99,999,999 (9,999,999,999,999 if 13-digit limit enabled). Relay status reflects display.
Total & Grand Total Reset	Via front panel button, external contact closure on digital input, or MeterView XL.
Total & Grand Total Reset Passwords	Total and grand total passwords may be entered to prevent resetting the total or grand total unless a password is entered.
Non-Resettable Grand Total	Grand total reset may be disabled through the meter interface. Grand total reset may be permanently disabled by selecting YES at the PERMLOCK menu. *Caution: Once the Grand Total has been programmed as "non-resettable" the feature cannot be disabled*

Batch Control

Methods	Automatic or Manual, count up or count down
Manual Batch Start	Pressing F1 function key starts the batch
Manual Batch Pause/Stop	Pressing F3 once pauses the batch, pressing it twice cancels the batch
Automatic Batching	The Loop Leader can be used as an automatic batch controller where batches run continuously without operator input
Batching Relay Operation	Single or dual-relay batching with optional preclose for dual-stage operation
Batch Preset	Set via F2 function key anywhere between 0.0001 to 99,999 based on batch total decimal point. If batch total is assigned to bottom, the preset can be up to 8 digits.
Batch Preclose	For two-stage batch application, a preclose value can be set to close the main flow line.
Automatic Batch Restart Delay	1 to 9,999 seconds. The batch will automatically restart after completion of the last batch.

Common Open Collector & Relay (Alarm) Specifications

Number	Two open collectors & two relays
High or Low Alarm	User programmable for high or low alarm
Alarm Deadband	0-100% FS, user programmable
Output Assignment	Pulse, Alarm, Timer, Stopwatch, or Disable
Alarm Output Source	Assign to rate, total, grand total, or digital input
On & Off Time Delay	0 to 9,999 seconds
Fail-Safe Operation	Independent for each open collector and relay. Fail-safe on, the output is on under normal conditions. Fail-safe off, the output is on under alarm conditions.
Alarm Operation	Automatic, automatic with manual override, latching (manual reset anytime), latching with reset after cleared (manual reset only after alarm has cleared)
Alarm Indication	Programmable: red backlight, flashing display, alarm symbol (!); (symbols not available on bargraph models). Bargraph segment flashes on alarm.
Alarm Message	Programmable: 8 characters maximum; displayed every 10 sec for 1 sec on bottom display. May be turned off.
Alarm Acknowledge	Front panel ACK button or external digital input resets output and screen indication.
Auto Initialization	When power is applied to the meter, open collectors and relays will reflect the state of the input to the meter.
Timer Output	One-shot or Continuous Off Time Delay: 1 sec to 99:59:59 (hrs:min:sec) On Time: 1 sec to 99:59:59 (hrs:min:sec)
Stopwatch	Output turns on when started and off when stopped.

Open Collector Outputs

Rating	Isolated open collector, sinking NPN 5-30 VDC @ 150 mA maximum
Output Assignment	Pulse, Alarm, Timer, Total Reset, Stopwatch on/off, or Disable
Pulse Output Source	Rate, Total, Grand Total, or Test Frequency
Pulse Output Factor	0.000001 to 999,999.9
Pulse Width	0.5 ms @ 1 kHz; 500 ms @ 1 Hz; 50% duty cycle
Pulse Output Frequency	1,000 Hz maximum
Quadrature Pulse Output	Available for Output 2 (90° behind Output 1) 500 Hz max
Alarm Output Source	Assign to Rate, Total, Grand Total or Digital Input

Solid State Relays

Rating	250 VAC/VDC @ 1A resistive 75VA; 250VAC; 0.6A pilot duty (inductive) – UL Code D300 25VA; 250VDC; 0.6A pilot duty (inductive) – UL Code R300
Noise Suppression	Metal oxide varistors across outputs
Relay Assignment	Alarm, Sample, Timer, Batch, Stopwatch on/off, or Disable
Alarm Output Source	Assign to Rate, Total, Grand Total, or Digital Input
Relay Runtime	Meter will keep track of how long each relay has operated and display this information.
Relay Cycles	Meter will keep track of how many times the relays have cycled and display this information.

4-20 mA Transmitter Output

Accuracy	±0.05% FS ±0.001mA
Output Source	Rate, total, re-transmit; reverse scaling allowed
Scaling Range	1.00 to 23.0 mA
Disable	High impedance state, less than 1 mA
Calibration	Factory calibrated 4.00 to 20.00 mA
Underrange	1.0 mA, 3.5 mA, or 3.8 mA (If input < 3.5 mA); or Off; user selectable
Overrange	20.5 mA, 20.8 mA, or 23.0 mA (If input > 20.5 mA); or Off; user selectable
Isolation	500 V input-to-output
Temperature Drift	0.5 µA/°C max from -40 to 75°C ambient
External Loop Power Supply	7.0 VDC to 30.0 VDC maximum
Output Loop Resistance	10-750 Ω @ 24 VDC; 10-1100 Ω @ 30 VDC

On-Board Digital Input

Function	Remote operation of front-panel buttons, acknowledge/reset relays, reset total, reset max/min values, etc. See User section of *Display Functions* & Messages on page *23* for a complete list of capabilities.
Contacts	2.1 VDC on contact. Connect normally open contacts across DI+ and DI-
Logic Levels	Logic High: 2.4 to 30 VDC (max) Logic Low: 0 to 0.9 VDC

MeterView XL Programming Software

Availability	Free download from www.predig.com
System Requirements	Microsoft® Windows® 7 & 10
Communications	USB 2.0 (Standard USB A to Micro USB B)
Configuration	Configure all parameters on the meter. Configure meters one at a time.
Configuration Files	Generate with or without meter connected; Save to file for later use.
USB Power Connection	Meter is powered by USB connection during programming, if 4-20 mA loop is not connected.

⚠️ **WARNING**

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

To download the MeterView XL programming software, visit predig.com/meterviewxl.

For detailed programming software instructions, see the LIM6622MVXL manual.

General Compliance Information
Electromagnetic Compatibility

EMC Emissions	• CFR 47 FCC Part 15 Subpart B Class A emissions requirements (USA) • AS/NZS CISPR 11 Class A ISM emissions requirements (Australia) • EN 55011 Group 1 Class A ISM emissions requirements (EU) • ICES-001 Issue 4 ISM emissions requirements (Canada)
EMC Emissions and Immunity	EN 61326-1 EMC requirements for Electrical equipment for measurement, control, and laboratory use – Inductrial Use

All Models

PD6626 & PD6628 Compliance Information

Safety

| UL & C-UL Listed	USA & Canada UL 61010-1 CAN/CSA-C22.2 No. 61010-1-12
UL File Number	E160849
Front Panel	UL Type 4X, NEMA 4X, IP65; panel gasket provided
Low Voltage Directive	IEC 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use.
Additional Standards	UL 50E

Hazardous Area Approvals

ATEX	**Certificate Number:** CML 17ATEX2015X Ex ia IIC T4 Ga ⟨Ex⟩ II 1G -40°C ≤ Ta ≤ 70°C
IECEx	**Certificate Number:** IECEx CML 17.0008X Ex ia IIC T4 Ga Tamb = -40°C to +70°C
UL & C-UL	**UL File Number:** E494837 (UL) LISTED Class I, Division 1, Groups A, B, C and D T4 Class I, Division 2, Groups A, B, C and D T4 Ex ia IIC T4 (Canada); Class I Zone 0, Zone 1, AEx ia IIC T4 (U.S.); Class I Zone 2, Group IIC T4 (U.S.) PROCESS CONTROL EQUIPMENT FOR USE IN HAZARDOUS LOCATIONS

ATEX/IECEx Assessment Standards

ATEX	IECEx
EN 60079-0:2012+A11:2013 EN 60079-11:2012	IEC 60079-0:2011 Ed. 6 IEC 60079-11:2011 Ed. 6

UL Assessment Standards

United States Standards	Canadian National Standards
UL 913, Eighth Edition UL 60079-0, Sixth Edition UL 60079-11, Sixth Edition Standard No. UL 121201, 9th Edition	CSA C22.2 No. 60079-0:15 CSA C22.2 No. 60079-11:14 CAN/CSA C22.2 No. 213-17

⟨Ex⟩ **IECEx** (UL) LISTED
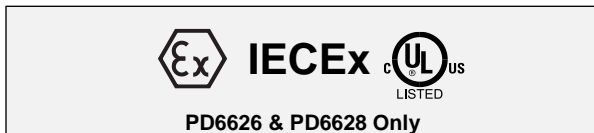
PD6626 & PD6628 Only

ATEX/IECEx Special Conditions for Safe Use

The following conditions relate to safe installation and/or use of the equipment.

- The permitted ambient temperature range for the PD6626/PD6628 is -40°C to 70°C.
- The equipment must be installed in an enclosure which provides a minimum degree of protection of IP20 for the equipment connections.
- Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a zone 0 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The equipment loop/power port must be connected to an intrinsically safe barrier with U_o ≥ 11V.
- Entity parameters must meet the following requirements:
  U_i: 30 V; I_i: 175 mA; C_i: 0 µF; L_i: 0 µH; P_i: 1.0 W
- For ATEX Certification, barrier and transmitter must be ATEX Certified with Entity Parameters and must be connected per manufacturer's instructions.

For European Community:

The PD6626/PD6628 must be installed in accordance with the Essential Health & Safety Requirements of Directive 2014/34/EU, the product certificates CML 17ATEX2015X and IECEx CML 17.0008X, and the product manual.

UL/C-UL Special Conditions for Safe Use

- Associated apparatus may be in a Division 2 or Zone location if so approved.
- Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. This is particularly important if the equipment is installed in a zone 0 location. In addition, the equipment shall only be cleaned with a damp cloth.
- The equipment shall be installed in a tool secured enclosure which provides a minimum degree of protection of IP20 for the equipment connections.
- Entity parameters must meet the following requirements:
  U_i: 30 V; I_i: 175 mA; C_i: 0 µF; L_i: 0 µH; P_i: 1.0 W

I.S. Equipment Entity Parameters	Required Relationship Between Entity Parameters	I.S. Barrier Entity Parameters
V max (or Ui)	≥	Voc or Vt (or Uo)
I max (or Ii)	≥	Isc or It (or Io)
P max, Pi	≥	Po
Ci + Ccable	≤	Ca (or Co)
Li + Lcable	≤	La (or Lo)

- **For Division 2 and Zone 2 Applications:**
  Division 2 and Zone 2 installations do NOT require the use of an intrinsically-safe barrier or intrinsically-safe entity parameters. Class I, Division 2, Groups A, B, C, and D T4 and Class I, Zone 2, Group IIC T4, -40C <= Ta <= +70C. Ratings: V = 30 V dc, I = 30 mA; Relay Ratings: 250V ac/dc 1A

For North American Community:

Installation and service of this device and/or associated apparatus (barrier) should be performed only by trained service personnel and must be installed in accordance with the manufacturer's control drawing, Article 504 of the National Electric Code (ANSI/NFPA 70) for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.

⚠ WARNING

- **EXPLOSION HAZARD** – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous
- **RISQUE D'EXPLOSION** – NE PAS BRANCHER NI DÉBRANCHER SOUS TENSION.

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.

EU Declaration of Conformity

EU Declaration of Conformity for the PD6622/24 and PD6626/28 are available in the Documentation CD provided with the product under the **EU DoC** menu.

Safety Information

⚠ CAUTION

- Read complete instructions prior to installation and operation of the meter.

⚠ WARNINGS

- Risk of electric shock or personal injury.
- 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 PD6626/PD6628 loop-powered meters, the hazardous location installation instructions for the transmitter, PD6626/PD6628 loop-powered meter, and associated apparatus (barrier) must be compatible.
- PD6626/PD6628 Series Loop-Powered 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.

Installation

There is no need to remove the meter from its case to complete the installation, wiring, and setup of the meter for most applications.

⚠ WARNING

• PD6626 and PD6628 installation must be performed in accordance with Control Drawing LIM6600-2 in order to meet agency approval ratings.

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.

Panel Mounting Instructions

• Prepare a standard 1/8 DIN panel cutout – 3.622" x 1.772" (92 mm x 45 mm). Refer to *Figure 1* and *Figure 2* below, for more details.

• Clearance: allow at least 4.0" (102 mm) behind the panel for wiring.

• Panel thickness: 0.04" - 0.25" (1.0 mm - 6.4 mm). Recommended minimum panel thickness to maintain Type 4X rating: 0.06" (1.5 mm) steel panel, 0.16" (4.1 mm) plastic panel.

• Remove the two mounting brackets provided with the meter (back-off the two screws so that there is ¼" (6.4 mm) or less through the bracket. Slide the bracket toward the front of the case and remove).

• Insert meter into the panel cutout.

• Install mounting brackets and tighten the screws against the panel. To achieve a proper seal, tighten the mounting bracket screws evenly until meter is snug to the panel along its short side. DO NOT OVER TIGHTEN, as the rear of the panel may be damaged.
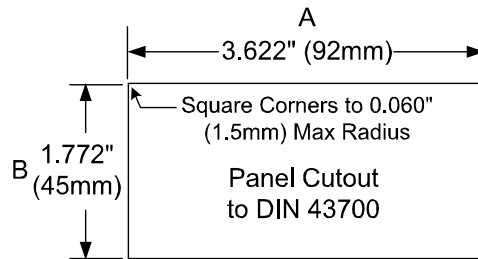
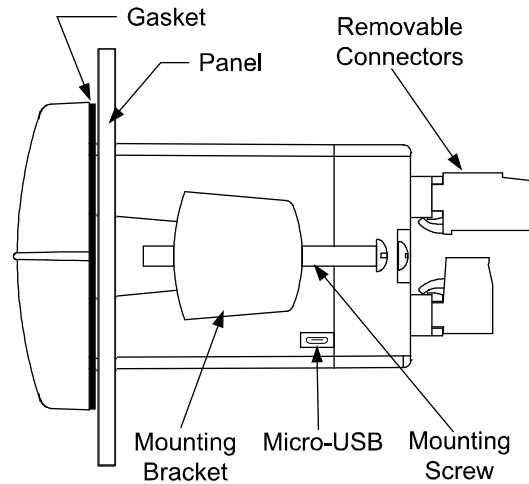
Figure 1. 1/8 DIN Panel Cutout Dimensions

Figure 2. Panel Mounting Details

MeterView XL Programming Software

Free, PC-based, MeterView XL software that connects to the meter via a USB cable is available for programming and setup of the meters. This software greatly simplifies the programming process and allows the user to save configuration files for later use. The meter will also be powered by the USB connection so no additional power is needed during programming.

- Free PC-Based USB Programming Software
- Easy Programming of Feature-Packed Product
- USB Connection Provides Power to the Meter During Programming
- Save & Print Configuration Files without Meter Connected
- USB Cable Provided with Meter
- PC Data Logging for One or Multiple Variables

MeterView XL Software Installation

⚠ **WARNING**

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

⚠ **IMPORTANT**

• Please uninstall previous versions of this software prior to downloading, installing, and running the latest version.

1. For complete instructions on how to use MeterView XL go to LIM6622MVXL manual.

2. Download MeterView XL Installation file to your PC from the included CD or go to www.predig.com/meterviewxl

3. Locate the MeterView XL zipped folder on your PC and double-click to extract and open:
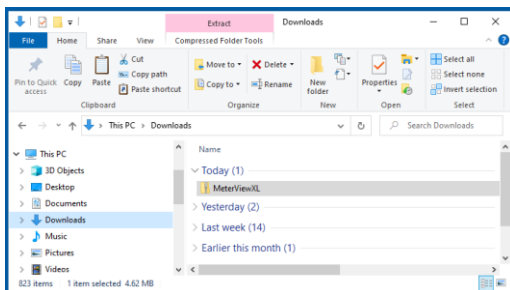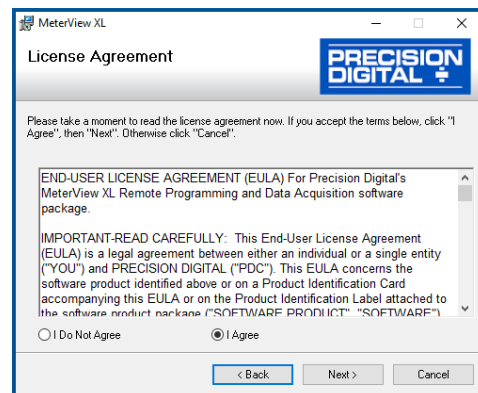

4. Double-click MeterView XL Windows Installer Package file to open:
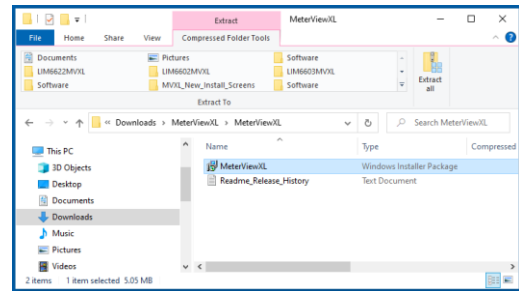
5. The MeterView XL Setup Wizard window will appear. Click "Next" to start the installation process:
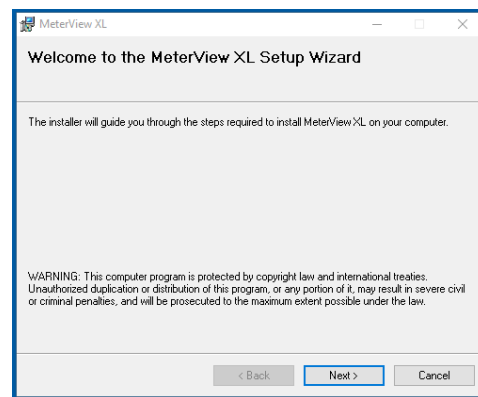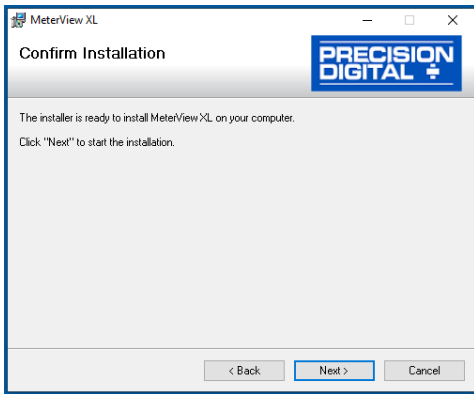

6. The MeterView XL License Agreement window appears next. Select "I agree" and click "Next" to continue the installation process:
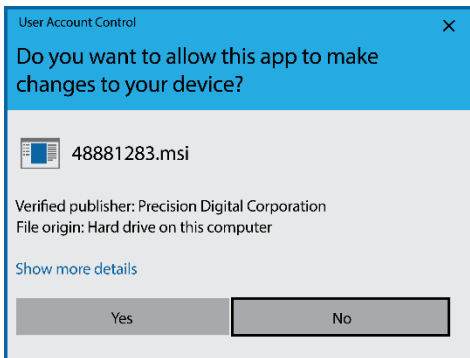
7. Choose the folder location where you would like the software to be installed to and select options for use. Then click "Next" to continue:
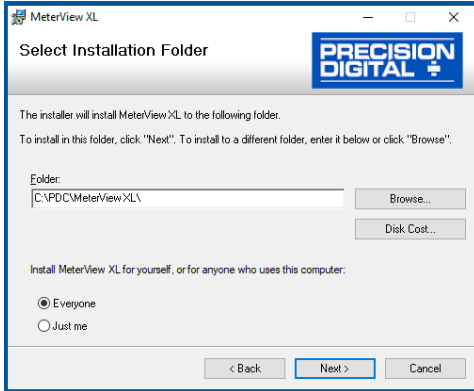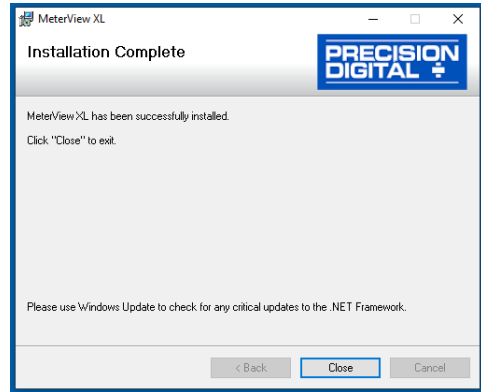

8. Confirmation window will appear. Click "Next" to confirm the installation:

9. The User Account Control message is displayed. Click "Yes" to proceed with the installation:

10. Finally, the Installation Complete window will appear. Click "Close" to exit:


Now you are ready to open the MeterView XL software to begin programming your Loop Leader meter.

Connecting to the Computer

Loop Leader series meters may be connected to any Windows 7 or Windows 10 PC via the provided USB cable by following these steps:

1. Open the MeterView XL software.
2. Connect the Loop Leader meter to the PC with the provided USB cable.
3. The software will ask if you would like to read the meter. Click OK.
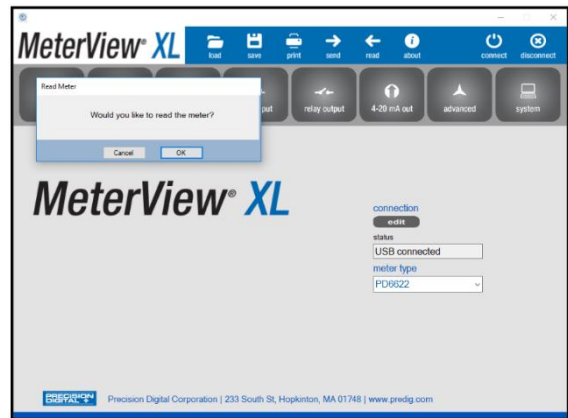
Specifications

|	
Availability	Free download from www.predig.com
System Requirements	Microsoft® Windows® 7 & 10
Communications	USB 2.0 (Standard USB A to USB B)
Configuration	Configure all parameters on the meter. Configure meters one at a time.
Configuration Files	Generate with or without meter connected; Save to file for later use.
USB Power Connection	Meter is powered by USB connection during programming, if 4-20 mA loop is not connected.

Dimensions

All units: inches (mm)
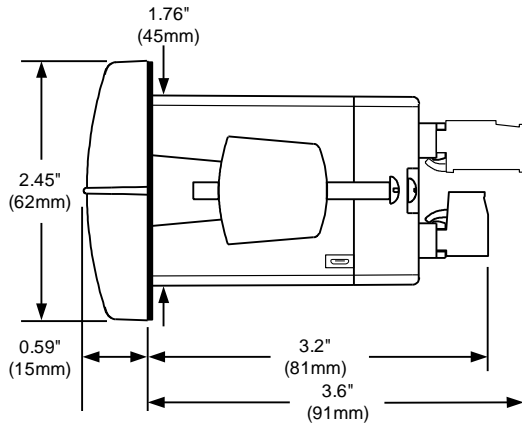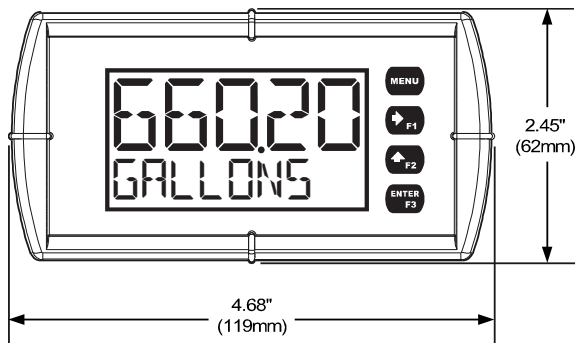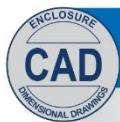

Figure 3. Meter Dimensions - Side View

Figure 4. Meter Dimensions - Front View

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

predig.com/documentation-cad

⚠ CAUTION

• Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the meter and ensure personnel safety.

Connections

All connections are made to removable screw terminal connectors located at the rear of the meter.

This section is only intended for PD6622 and PD6624 safe area installations.

⚠ WARNING

• PD6626 and PD6628 installation must be performed in accordance with Control Drawing LIM6600-2 in order to meet agency approval ratings.

Connectors Labeling

The graphics below show the location of all connectors available with requested configuration.
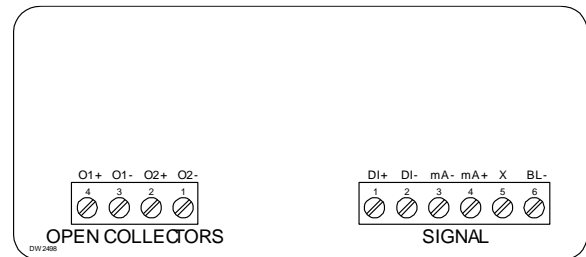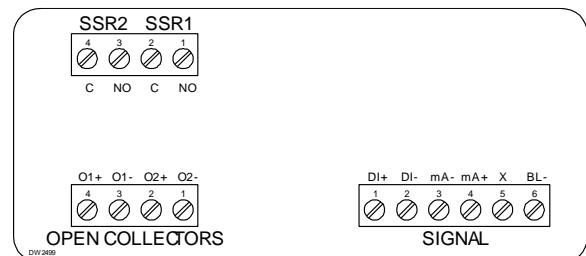

Figure 5. Connector Labeling for PD662#-LNN

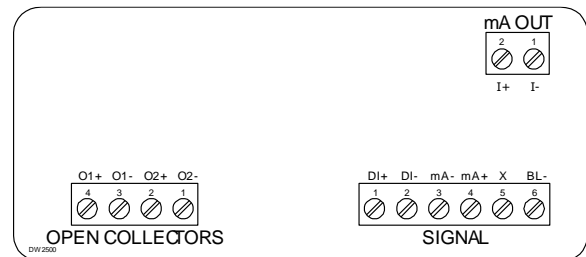**Figure 6. Connector Labeling for PD662#-L2N with 2-Solid State Relays**

Figure 7. Connector Labeling for PD662#-L3N with 4-20 mA Output
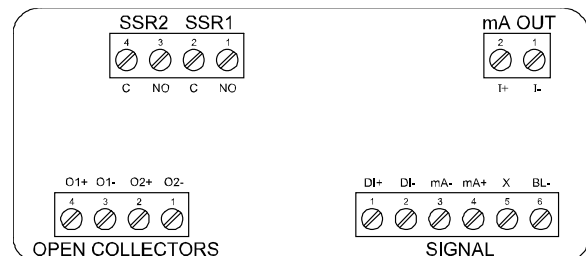

19

Figure 8. Connector Labeling for PD662#-L5N with 2 Solid State Relays & 4-20 mA Output

Wiring Diagrams

Safe Area Current Loop (4-20 mA) Connections

> ⚠ **WARNING**
>
> • PD6626 and PD6628 installation must be performed in accordance with Control Drawing LIM6600-2 in order to meet agency approval ratings.

Signal connections are made to a six-terminal connector labeled SIGNAL on *Figures 5-8* on page *19*. The following figures show a 4-20 mA current loop connected to the meter. *Figure 9* shows the connection without the backlight and *Figure 10* shows the connection with the backlight (the backlight can be disabled/enabled in the 5Y5TEM menu). The meter is powered by the 4-20 mA current loop.

There are no switches or jumpers to set up for the input. Setup and programming is performed through the front panel buttons or PC-based software.
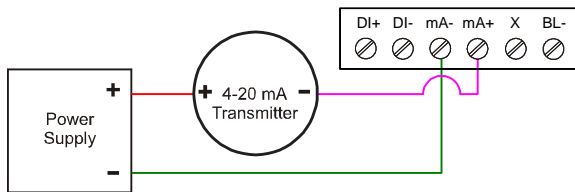

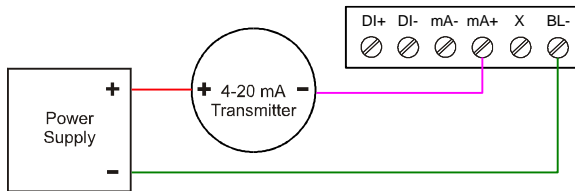**Figure 9. 4-20 mA Input Connection without Backlight**

Figure 10. 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.

Safe Area Digital Input Connection

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-.
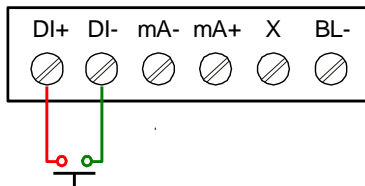
Figure 11. Digital Input Connections

Safe Area 4-20 mA Output Connections

Connections for the 4-20 mA transmitter output are made to the connector terminals labeled mA OUT. The 4-20 mA output must be powered from an external power supply.
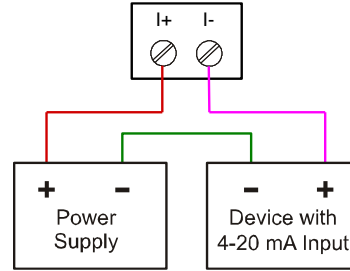
Figure 12. 4-20 mA Output Connections

Safe Area Solid State Relay Connections

Relay connections are made to a four-terminal connector labeled SSR1 and SSR2 on *Figure 6. Connector Labeling for PD662#-L2N with 2-Solid State* Relays and *Figure 8. Connector Labeling for PD662#-L5N with 2 Solid State Relays & 4-20 mA Output* on page *19*. Each relay's C terminal is common only to the normally open (NO) contact of the corresponding relay.
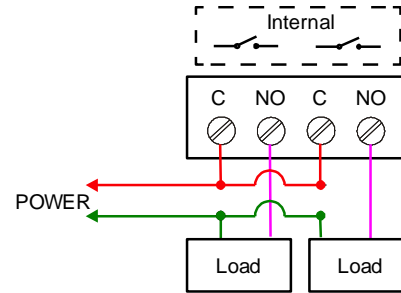
Figure 13. Solid State Relay Connections

Safe Area Open Collector Outputs

Open collector output 1 and 2 connections are made to terminals labeled O1+ and O1-, and O2+ and O2-. Connect the alarm or pulse input device as shown below.

Figure 14. Open Collector Output Connections

20

Remote Operation of Meter

The meter is equipped with a digital input that can be programmed to perform various functions. Common uses for this digital input would be for resetting the total, resetting the meter's relays or open collectors, starting and stopping timers, displaying max/min values and starting/stopping batches. The digital input could be connected to a PDA2361-R single button remote control station as illustrated in *Figure 15.*
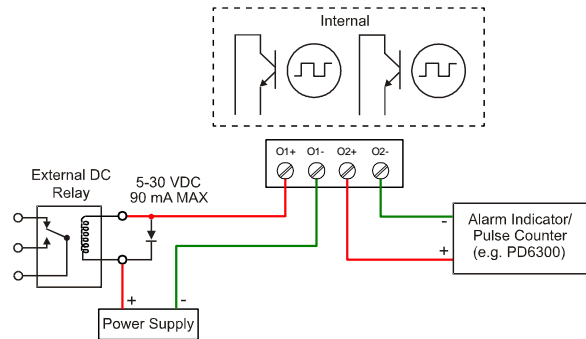
For a complete list of Digital Input settings, see *Function Keys & Digital Input Available Settings* on page *43*

Note:

These control stations 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.
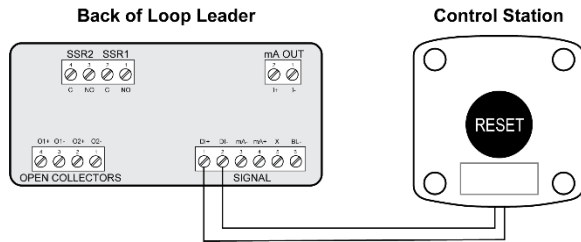
Figure 15. PDA2361-R Control Station Connected to PD6624

Available Single Button Control Stations

PDA2360-E	PDA2361-A	PDA2361-B

PDA2361-R	PDA2361-T	PDA2361-S

PDA2361-Q

Wiring Connections for MOD-LH Models

The following diagram is for MOD-LH models with a single color light.

The Light / Horn cannot be powered by the 4-20 mA loop. To use the Light / Horn an external power supply must be used such as the PDA1024-01 as the following diagram illustrates.

Light / Horn Wire Color Chart

(Red)	Blue, Green, Red, White, or Yellow (Light)
(Black)	Black (Steady On)
(Gray)	Gray (Flashing Light)
(Purple)	Purple (Horn)
(Brown)	Brown (Power)
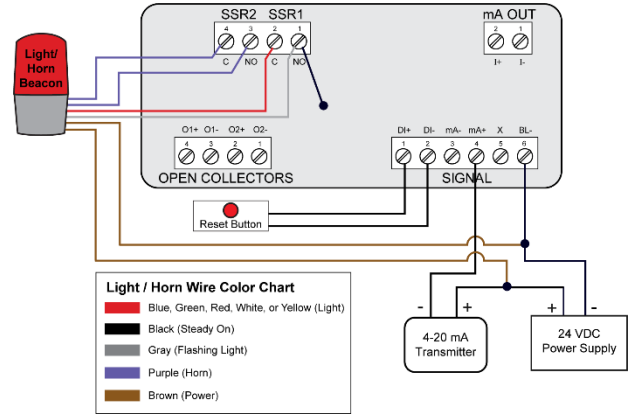
Figure 16. Light / Horn and Button (MOD-LH) Connected to PD6624

Available Light/Horn Colors

PDA-LHR	PDA-LHB	PDA-LHG

PDA-LHY	PDA-LHW

21

Setup and Programming

> The meter is factory calibrated prior to shipment to display 0 to 100, 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 front panel buttons or PC-based software.

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

MeterView XL Programming Software

The meter can also be programmed using PC-based MeterView XL 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 MeterView XL programming software, visit predig.com/meterviewxl.

For detailed programming software instructions, see the LIM6622MVXL manual.

⚠ 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.

Front Panel Buttons and Status LCD Indicators

PD6622/PD6626

PD6624/PD6628

Button Symbol	Description	LCD	Status
MENU	Menu	!	Alarm Indicator *(PD6622/6 Only)*
►F1	Right-Arrow/F1	🔒	Password Protection Indicator *(PD6622/6 Only)*
▲F2	Up-Arrow/F2	G	Grand Total Indicator *(PD6622/6 Only)*
ENTER F3	Enter/F3	T	Total Indicator *(PD6622/6 Only)*
		▌	Rate Bargraph *(PD6624/8 Only)*

1. Press the **Menu** button to enter or exit the Programming Mode at any time.
2. Press or hold the **Right-Arrow** button to scroll forward through the menus, select digits during numeric programming, select characters during text programming, or decrement the value of a digit or character selected with the **Up-Arrow** button.
3. Press and hold the **Right-Arrow** button to zero or clear digits/characters while in data-entry mode.
4. Press or hold the **Up-Arrow** button to scroll backwards through the menus or to increment the value of a digit or character.
5. Press the **Enter** button to access a menu or to accept a setting or programmed digit/character value.

Display Functions & Messages

The meter displays various functions and messages during setup, programming, and operation. The following table shows the main menu functions and messages in the order they appear in the menu.

Parameter	Action/Setting Description
INPUT	Program the meter 4-20 mA input
SCALE RATE	Scale the rate input
UNITS	Select the display units
/SECOND	Units per second
/MINUTE	Units per minute
/HOUR	Units per hour
/DAY	Units per day
GAL/(T)	Gallons per time unit (T)
L/(T)	Liters per time unit (T)
IGAL/(T)	Imperial gallons per time unit (T)
M3/(T)	Cubic meters per time unit (T)
BBL/(T)	Barrels per time unit (T)
BUSH/(T)	Bushels per time unit (T)
cuYD/(T)	Cubic Yards per time unit (T)
cuFt/(T)	Cubic Feet per time unit (T)
cuIn/(T)	Cubic Inches per time unit (T)
L.BBL/(T)	Liquid barrels per time unit (T)
BBBL/(T)	Beer barrels per time unit (T)
HECtL/(T)	Hectoliter per time unit (T)
AF/(T)	Acre-Foot per time unit (T)
CUSTOM/(T)	Custom unit per time unit (T)
INPUT 1	Program input 1 value
INP 1	Enter the input 1 value
DISP 1	Program display 1 value
DSP 1	Enter the display 1 value
INPUT 2	Program input 2 value (up to 32 points)
INP 2	Enter the input 2 value
DISP 2	Program display 2 value (up to 32 points)
DSP 2	Enter the display 2 value
SAVE?	Save programmed units, input, and display values
OUTPUT	Program the meter's available outputs
OPEN COLLECTR	Program the meter's open collector outputs
OUTPUT1	Open collector 1 setup
OUTPUT2	Open collector 2 setup
DISABLE	Disable the open collector

Parameter	Action/Setting Description
PULSE	Program the open collector for pulse output
ALARM	Program the open collector for alarm output
TIMER	Program the open collector as a timer
TOT RST	Program the open collector for total reset
STPWATCH	Program the open collector to turn on while the stopwatch is running
RELAY	Program the meter's relay outputs
OUTPUT1	Relay 1 setup
OUTPUT2	Relay 2 setup
DISABLE	Disable the relay
ALARM	Program relay for alarm functionality
SAMPLE	Program relay for sample functionality
TIMER	Program relay as a timer
BATCH	Program the relay for batch control functionality
STPWATCH	Program relay to turn on while the stopwatch is running
INFO	View relay run time and cycle count
4-20 mA	Program the meter's 4-20 mA output
RATE	Transmit a value based on the rate display
TOTAL	Transmit a value based on the total display
RETRANS	Retransmit the 4-20 mA input signal
DISABLE	Disable the 4-20 mA output
CONTROL	Program manual or automatic operation for the outputs
OC 1	Open collector 1
OC2	Open collector 2
RELAY 1	Relay 1
RELAY2	Relay 2
4-20 mA	4-20 mA output
AUTO	Set selected output to automatic operation
MANUAL	Manually control selected output operation
ADVANCED	Program the meter's advanced features
RATE	Advanced 4-20 mA rate input programming
FUNCTION	Select linear, square root, or programmable exponent function

Parameter	Action/Setting Description
LINEAR	Set meter for linear function and select number of linearization points
SQROOT	Set meter for square root extraction
EXPONENT	Set meter for programmable exponent and enter exponent value
SCALECAL	Scale or calibrate the 4-20 mA input
SCALE RATE	Scale the rate 4-20 mA input
CAL RATE	Calibrate the rate 4-20 mA input
TOTAL	Advanced total programming
COUNT	Program the totalizer functionality
LIMIT	Set the number of digits used for the total
8-DIGIT	Eight digits max (99,999,999)
13-DIGIT	Thirteen digits max (9,999,999,999,999) Requires top and bottom display to display entire number, total will roll over to zero when it exceeds the limit.
INITIAL	Set the total to start at a specific number
RESET	Enable or disable the ability to reset the total
ENABLE	Enable total reset (default)
DISABLE	Disable total reset
GTOTAL	Advanced grand total programming
COUNT	Program the totalizer functionality
LIMIT	Set the number of digits used for the total
8-DIGIT	Eight digits max (99,999,999)
13-DIGIT	Thirteen digits max (9,999,999,999,999) Requires top and bottom display to display entire number, total will roll over to zero when it exceeds the limit.
INITIAL	Set the total to start at a specific number
RESET	Enable or disable the ability to reset the grand total
ENABLE	Enable grand total reset (default)
DISABLE	Disable grand total reset
PERMLOCK	Set grand total as non-resettable
CUTOFF	Set low-flow cutoff
DISABLE	Disable low-flow cutoff
ENABLE	Enable low-flow cutoff
FILTER	Set noise filter value
10 SEC	1 second
20 SEC	2 seconds

Parameter	Action/Setting Description
40 SEC	4 seconds
80 SEC	8 seconds
160 SEC	16 seconds
OFF	Turn filter off
BYPASS	Set filter bypass (0.0 to 99.9% FS)
PASSWRD	Set a password for the meter
MAIN	Program the main meter password
TOTAL	Program the total reset password
GTOTAL	Program the grand total reset password
USER	Assign function keys and digital input
F1	Assign F1 function key
F2	Assign F2 function key
F3	Assign F3 function key
DI	Assign digital input
DISP FN	Set the function key or digital input to display a value
DISPLAY	Cycle max, min, rate, total, and grand total
D RATE	Display the rate
D TOTAL	Display the total
DISP GT	Display the grand total
PCTRATE	Display the rate's percentage of max (20 mA)
D UNITS	Display the rate, total, and grand total units
D TAG	Display the tags
DISPMIN	Display the minimum rate value
DISPMAX	Display the maximum rate value
MIN MAX	Display the minimum and maximum rate value
D mA IN	Display the current mA input value
D mAOUT	Display the current mA output value
MENU FN	Set the function key or digital input to access a menu
RLYINFO	Go to relay information menu (INFO)
MANCTRL	Go to output control menu (CONTROL)
TIMR OC1	Open collector 1 timer
TIMR OC2	Open collector 2 timer
TIMER R1	Relay 1 timer
TIMER R2	Relay 2 timer
TIMERFN	Set the function key or digital input to start or stop a timer
STRTALL	Start all timers
STOPALL	Stop all timers

Parameter	Action/Setting Description
SSTPALL	Start or stop all timers
OC1	Start/stop open collector 1 timer
OC2	Start/stop open collector 2 timer
RLY1	Start/stop relay 1 timer
RLY2	Start/stop relay 2 timer
START	Start the selected timer output
STOP	Stop the selected timer output
STR--STP	Start or stop the selected timer output
BATCHFN	Set the function key or digital input to batch control
START	Start a batch
STOP	Stop a batch
STR--STP	Start or stop a batch
PRESET	Preset batch amount
ALARMFN	Set the function key or digital input to acknowledge an alarm or access set points
ACK	Acknowledge all active alarms
SETPOINT	Access all output set points
SETPTOC1	Access open collector 1 set point
SETPTOC2	Access open collector 2 set point
SETPTR1	Access relay 1 set point
SETPTR2	Access relay 2 set point
SWATCHFN	Set the function key or digital input to activate stopwatch
START	Start the stopwatch
STOP	Pause/Stop the stopwatch
STR--STP	Start or stop the stopwatch
HOLD FN	Set the function key or digital input to hold an output
HOLDOUT	Hold all outputs
HLDUNHLD	Hold or un-hold all outputs
OC1+2	Hold/un-hold open collector outputs
RLY1+2	Hold/un-hold relay outputs
mAOUT	Hold/un-hold 4-20 mA output
HOLD	Hold selected output
HLDUNHLD	Hold or un-hold selected output
DISABLE	Disable the function key or digital input
RST FN	Set the function key or digital input to reset a value
RESET	Reset min, max, or max/min rate value
R MINMAX	Reset max and min rate value
RST T	Reset the total
RST GT	Reset the grand total

Parameter	Action/Setting Description
RST TGT	Reset the total and grand total
HINT	Display hint text on first key press and execute action on second key press
OFF	Turn the hint function off
ON	Turn the hint function on
SYSTEM	Program system settings
AOUTCAL	Calibrate the analog output
DEFAULT	Reset meter to factory defaults
TOTAL	Enable or disable the totalizer
ENABLE	Enable the totalizer (Default)
DISABLE	Disable the totalizer (see PD6602 manual)
BACKLITE	Enable or disable the display backlight
ENABLE	Enable the backlight (default)
DISABLE	Disable the backlight
INFO	View meter software version and model, and change the meter identifier tag
SFT	The software ID number
VER	The software version
MODEL	The meter hardware model number
IDTAG	The meter identifier tag. Press *Enter* to edit tag
ICAL	Internal calibration used for scaling
DISPLAY	Program the meter's display
UNITS	Change the display units within the selected unit class
DECPT	Change the decimal point location
RATE	Program the rate decimal point
TOTAL	Program the total decimal point
GTOTAL	Program the grand total decimal point
COMMA	Enable or disable the use of a comma to separate the thousands place on the bottom display
ENABLE	Enable comma (default)
DISABLE	Disable comma
TOP	Select what to display on the top display
RATE	Display the rate
RATE+U	Display the rate and its units alternating
TOTAL	Display the total
TOTAL+U	Display the total and its units alternating
GTOTAL	Display the grand total

Parameter	Action/Setting Description
TAG	Display the tag
UNITS	Display the units
PRESET	Display the preset value
STPWATCH	Display the stopwatch
TIMR OC1	Display open collector 1 timer
TIMR OC2	Display open collector 2 timer
TIMER R1	Display relay 1 timer
TIMER R2	Display relay 2 timer
MIN	Display minimum value
MAX	Display maximum value
MIN MAX	Display alternating min and max
BOTTOM	Select what to display on the bottom display
TOTAL	Display the total
TOTAL+U	Display the total and its units alternating
TOT+TAG	Display the total and its tag alternating
T+U+RU	Display the total, its units, and the rate units alternating
GTOTAL	Display the grand total
GT+UNITS	Display the grand total and its units alternating
GT+TAG	Display the grand total and its tag alternating
GT+U+RU	Display the grand total, units, and rate units alternating
RATE	Display the rate

Parameter	Action/Setting Description
RATE+TU	Display the rate and the total's units alternating
RATE+U	Display the rate and its units alternating
RATE+TAG	Display the rate and its tag alternating
R UNITS	Display the rate units
T UNITS	Display the total units
TAG	Display the tag
UNITS	Display the units
PRESET	Display the preset value
STPWATCH	Display the stopwatch
TIMR OC1	Display open collector 1 timer
TIMR OC2	Display open collector 2 timer
TIMER R1	Display relay 1 timer
TIMER R2	Display relay 2 timer
TAG+RU	Display the tag and rate units alternating
TAG+TU	Display the tag and total units alternating
OFF	Disable the bottom display
R PCT	Display the rate's percentage of full scale
mA IN	Display the current mA input value
mA OUT	Display the current mA output value

Main Menu

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

- Press **Menu** button to enter *Programming Mode* then press the **Right-Arrow** button to move for-ward 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 set-ting or pressing **Enter/F3** at the ５Ａ∀Ε？ screen when available.

Note: The ℬＡℛℊℛＡℙℋ menu appears in the PD6624/8 menu only.
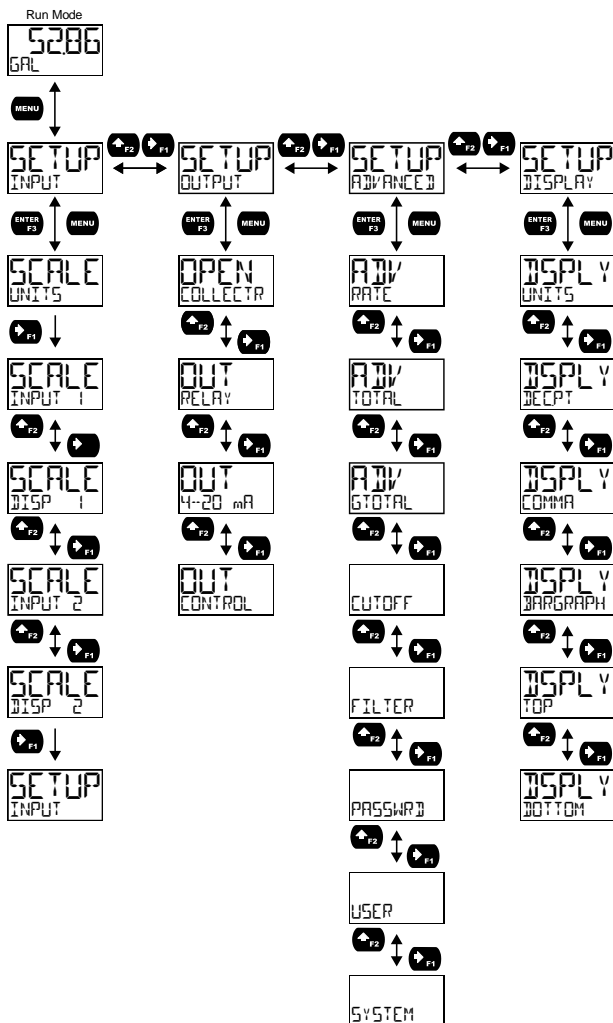
Setting Numeric Values

The numeric values are set using the **Right** and **Up-Arrow** buttons.

1. Press **Right-Arrow** to select next digit and **Up-Arrow** to increment digit value. The selected digit will flash.

2. Press and hold **Up-Arrow** to auto-increment the display value. If you have made a mistake or would like to enter a new value, select the left-most digit and press and hold the **Right-Arrow** button until all digits reset to zero.

3. Press the **Enter** button at any time to accept a setting or **Menu** button to exit without saving changes.

Note: the underscore in the graphic below is provided to show which digit would be flashing.
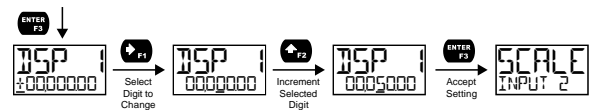
Scaling the 4-20 mA Input (ＩＮＰＵＴ)

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 gal/s, which corre-sponds 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.
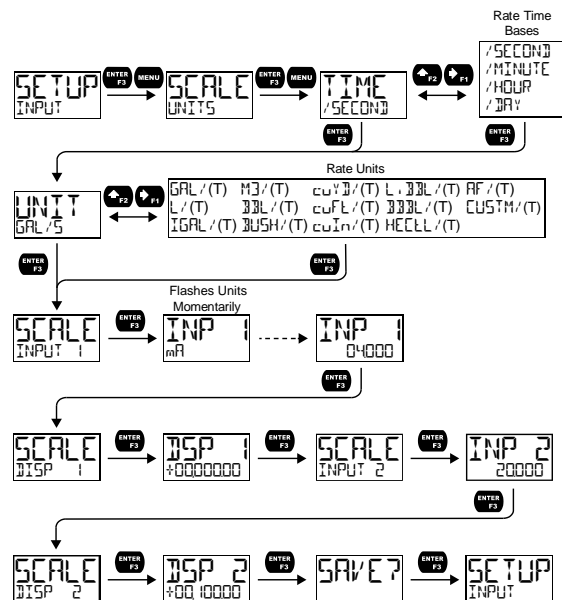
Available Engineering Units

The meter has preprogrammed rate and time base units. The following are the available units to choose from:

Rate Time Bases (TIME)	
/SECOND	Units per second
/MINUTE	Units per minute
/HOUR	Units per hour
/DAY	Units per day

Rate Units (RATE)	
GAL/(T)	Gallons per time unit (T)
L/(T)	Liters per time unit (T)
IGAL/(T)	Imperial gallons per time unit (T)
M3/(T)	Cubic meters per time unit (T)
BBL/(T)	Barrels per time unit (T)
BUSH/(T)	Bushels per time unit (T)
cuYD/(T)	Cubic Yards per time unit (T)
cuFt/(T)	Cubic Feet per time unit (T)
cuIn/(T)	Cubic Inches per time unit (T)
L.BBL/(T)	Liquid barrels per time unit (T)
BBBL/(T)	Beer barrels per time unit (T)
HECtL/(T)	Hectoliter per time unit (T)
AF/(T)	Acre-Foot per time unit (T)
CUSTOM/	Custom unit per time unit (T)

Note: for access to additional predefined units, you must disable the totalizer. See Disabling the Totalizer (TOTAL) on page 51.

Setting Custom Units (CUSTOM)

When the desired unit of measure is not available, a custom unit may be programmed. Select the CUSTOM menu to enter a custom unit name.

Text values are set using the **Right** and **Up-Arrow** buttons. Press **Right-Arrow** to select next character and **Up-Arrow** to increment character value. The selected character will flash. Press and hold the **Up** or **Right-Arrow** buttons to auto-increment or decrement the character. Press **Enter** to accept the character.
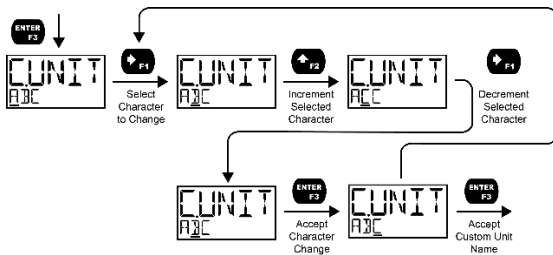
Notes:

- *Press and hold the **Right-Arrow** while no character is being edited to erase all characters to the right of the flashing character*
- *Press and hold **Up** or **Right-Arrow** to auto-increment or decrement a selected character.*
- *All text values, including tags and alarm messages, are set in a similar fashion.*

Scaling Example

The 4-20 mA input can be scaled to the appropriate values for a given application. The 4 mA input (input 1) should have a corresponding display value (display 1) which represents the low end of the process value range being measured by the transmitter. Likewise, the 20 mA input (input 2) should have a display value (display 2) which represents the high end of the process value range.

For example: If the meter is setup to accept a 4-20 mA input and display the flow of a pipe whose rate of flow is between 0 and 100 gal/s, the transmitter would send a 4 mA signal when there is zero flow and a 20 mA signal when there is maximum flow. The meter should be programmed to interpret these inputs on a display range of 0-100, so that at 4 mA the meter will display 0 and at 20 mA the meter will display 100.

Processes which require a non-linear scale can be accommodated using the linear (LINEAR), exponent (EXPONENT), and square root (SQROOT) functions available in the Advanced menu. See *Input Signal Conditioning Functions* (FUNCTION) on page *38*.

A signal source is not needed to scale the meter; simply program the inputs and corresponding display values.

Setting the Display Features (DISPLAY)

The meter's display functions may be programmed using the *Display* menu. This menu consists of the following submenus: *Units*, *Decimal Point*, *Comma*, *Bargraph* (PD6624/8 Only), *Top*, and *Bottom*.
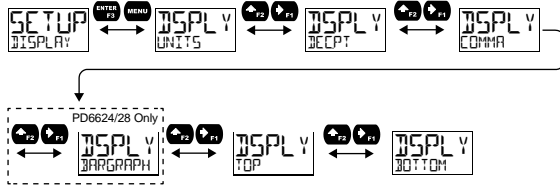

Changing the Engineering Units (UNITS)

It is possible to change the display units without the need to re-scale the meter. When selecting a new unit from within the DISPLAY menu (e.g. changing from gallons/sec. (GAL/S) to liters/sec. (L/S)), 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 (CUSTM), a custom conversion factor will need to be entered.

Changing the Decimal Point (DECPT)

The decimal point may be set with up to seven decimal places or with no decimal point at all.

Pressing the *Right-Arrow* moves the decimal point one place to the right until no decimal point is displayed, and then it moves to the left most position. Pressing the *Up-Arrow* moves the decimal point one place to the left.

The decimal point location is set independently for the rate, total and grand total.
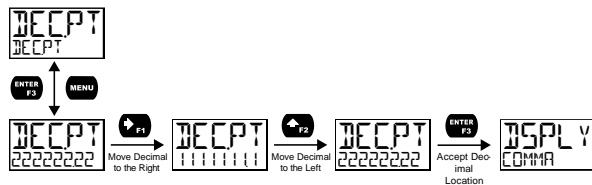
Enabling or Disabling the Commas on the Bottom Display (COMMA)

The bottom display is set to show a comma separating the thousands and millions place by default if a numeric value is being displayed. This feature can be disabled or enabled using the *Comma* menu.

Display Capabilities Optimization (TOP and BOTTOM)

Display Configuration Examples

The meter's dual-line display can be setup in multiple ways to provide an extremely informative view of the process variable being monitored. The following graphics show typical configurations:

Top Display: Toggle Flow Rate and Rate Units
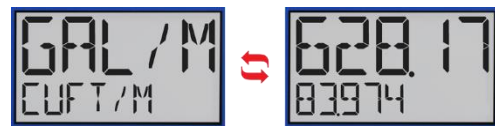**Bottom Display**: Toggle Total Flow and Total Units
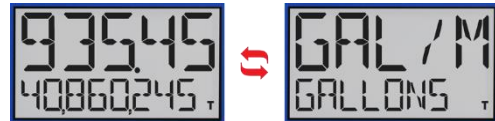
Note: To display units as GALLONS, select custom units and enter the desired text.

Top Display: Flow Rate
Bottom Display: Toggling Between Units and Tag
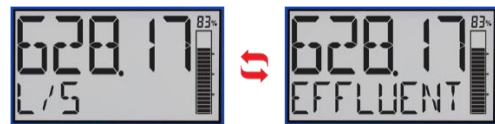
Dual-Scale Mode:
Top Display: Toggle Rate and GPM Units
Bottom Display: Toggle Rate and CFM Units

Top Display: Maximum Value
Bottom Display: Process Value

Using 13 Digits to Display Total

The top and bottom displays can be setup to display a 13-digit total:

Most Significant Digits on Top

## Configuring the Display (TOP and BOTTOM)

The two display lines (*Top* and *Bottom*) can be programmed to display different values. Use the *Top* and *Bottom* menus to make these changes. If PV2 is enabled, additional options will be available for displaying the second PV on the bottom display.

The top display (TOP) can display:

- Rate
- Rate and its units alternating
- Total
- Total and its units alternating
- Grand Total
- Tag
- Units
- Preset batch value
- Stopwatch
- Open Collector 1 or 2 Timer
- Relay 1 or 2 Timer
- Minimum Value, Maximum Value, or Both
- Off (Blank)

Top Line Display Parameters

The bottom display (BOTTOM) can display:

- Total (with units or tag alternating)
- Total, its units, and the rate units alternating
- Grand total (with units or tag alternating)
- Grand total, units, and rate units alternating
- Rate (with units or tag alternating)
- Rate and the total's units alternating
- Rate or total units
- Tag
- Units
- Preset batch value
- Stopwatch
- Open Collector 1 or 2 Timer
- Relay 1 or 2 Timer
- Tag and rate units alternating
- Tag and total units alternating
- Off (Blank)
- Rate's percentage of max scale
- mA input value
- mA output value


Bottom Line Display Parameters
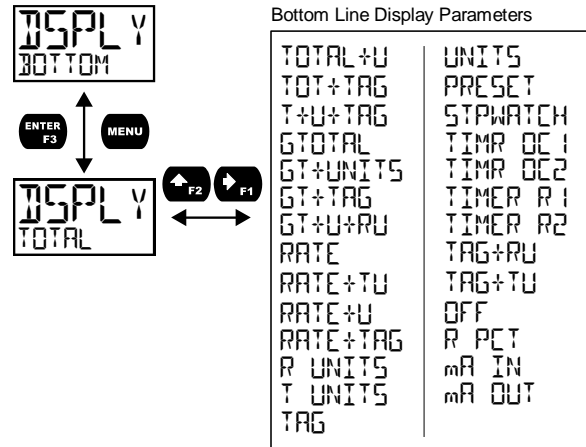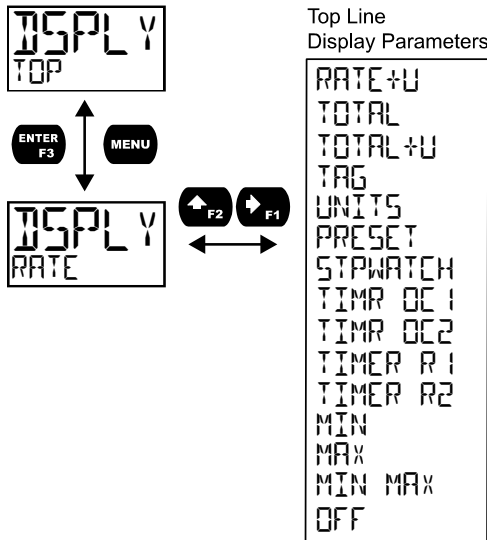
Programming the Bargraph (PD6624 & PD6628 Only)

The PD6624 and PD6628 come equipped with a bargraph display for applications where a visual representation of the rate or total's percentage of full scale is desirable. This feature can be changed to represent either rate, a percentage of the rate, or total, or disabled, using the *Bargraph* menu (BARGRAPH). If the bargraph is set to represent total, the total full scale will need to be set.

30
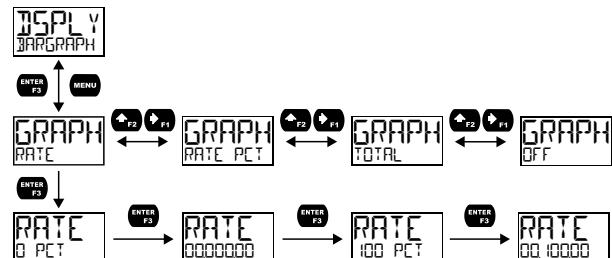
Programming the Outputs (OUTPUT)

Depending on the purchased model, the meter may be available with two open collector outputs, two solid state relays, and one 4-20 mA output. The *Output* menu will only show options for the available outputs. See *Ordering Information* on page *8* for details.
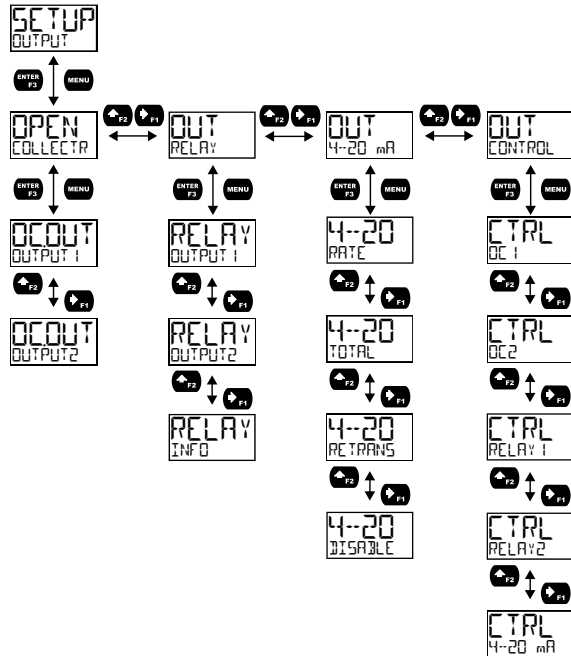
Open Collector Outputs (OPEN COLLECTR)

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

Pulse outputs can be set to transmit the rate, total, or grand total. 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 rate 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.

A total reset output generates a pulse whenever the total is reset, regardless of the reset method used. The On time is programmable between 0 and 9,999 seconds.

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:
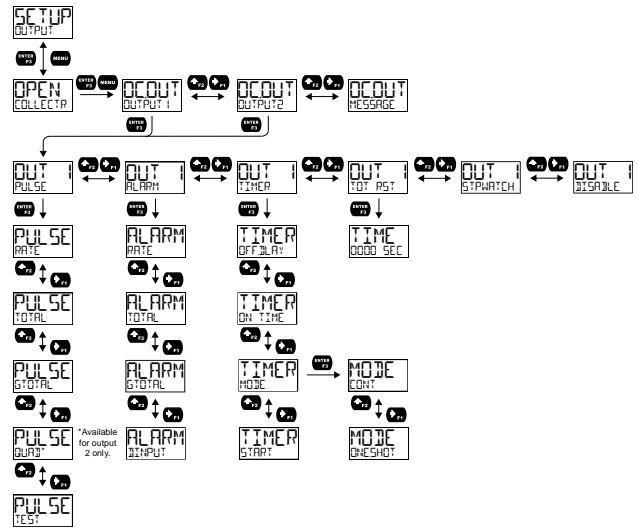
Pulse Output (PULSE)

Pulse outputs may be assigned to output the rate, total, or grand total at a programmable factor. If the output is assigned to rate, the factor is a multiplier that determines the number of pulses generated based on the rate. For example, if the meter display shows 100 gallons/second and the factor is set to 2, the number of pulses generated per second would be 200. If the output is assigned to total or grand total, the k-factor corresponds to the number of pulses generated per unit of measure. For example, if the k-factor is 0.001 and the units are gallons, one pulse will be generated for every 1,000 gallons. The maximum frequency is 1,000 Hz.

Setting output 2 to quadrature will duplicate the other open collector output, but lag by 90 degrees out of phase. The other output should be programmed as desired for the quadrature output function and must be a pulse (PULSE) output selection. The quadrature maximum frequency for both outputs is 500 Hz.

The TEST option will output a fixed number of pulses per second based on the FREQ value entered.
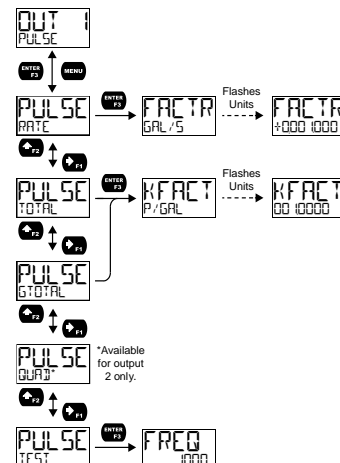

31

Alarm (ALARM)

Alarm outputs may be assigned to the rate, total, grand total, or the digital input. When assigned to the rate, the alarm may be set as either a high alarm or a low alarm. Alarm actions (AUTO, AUTOMAN, LATCH, L-CLEAR) determine how and when the alarm should be reset. They operate as follows:

- **Automatic (AUTO):** Alarm will reset automatically once the alarm condition has cleared.

- **Automatic/Manual (AUTOMAN):** Alarm will reset automatically once the alarm condition has cleared but can also be reset using the *Enter* (ACK) button (or whichever function key is set to acknowledge) at any time.

- **Latching (LATCH):** Alarm must be reset manually and can be done so at any time. Press the *Enter* (ACK) button at any time to clear the alarm.

- **Latching with Reset after Clear (L-CLEAR):** Alarm must be reset manually and can only be done so after the alarm condition has cleared. Press the *Enter* (ACK) button after the alarm condition has cleared to reset the alarm.

If the alarm is set to rate, a set and reset point must be programmed. The set point is the display value at which the alarm will turn on and the reset point is the display value at which the alarm will turn off. If the set point is lower than the reset point, the alarm will be a low alarm; if the set point is higher than the reset point, the alarm will be a high alarm. The digital input alarm will trigger whenever the digital input is triggered.

For both the rate and digital input alarms, a delay before the alarm is turned on or off may be set, as well as a fail-safe feature which reverses the on/off operation of the open collectors.

Alarm states will be displayed on the meter even if no open collector output is physically connected. These may include a red LED backlight, flashing the rate value (rate alarm only), and a programmable alarm message. In addition, for meters without a bargraph an alarm indicator (!) will also display.
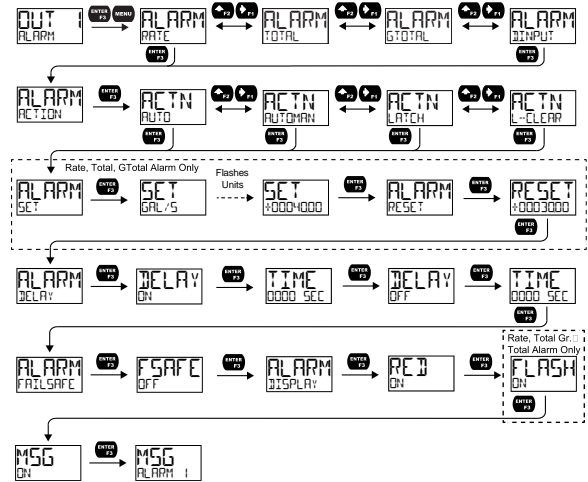
Flashing Red Alarm (RED)

The last two lines in the preceding menu flow chart show how to program the display to turn red, flash, and display a message when an alarm occurs.

Alarm 1 is High Alarm:	Alarm 2 is Low Alarm:

Timer (TIMER)

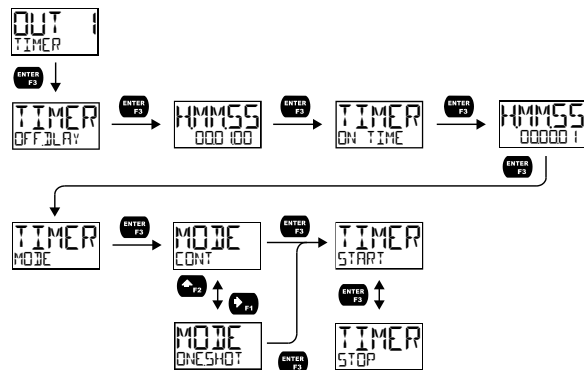The timer output may be set to generate the timed pulse only once (ONESHOT) or continuously (CONT).

The timer output produces a constant width pulse at a constant frequency, if set as continuous timer. Program the *Off Delay* (OFF.DLAY) from 1 second to 99 hours 59 minutes and 59 seconds. This is the time it takes from selecting START to turning on the output and for how long the output is off in continuous mode.

Program the *On Time* (ONTIME) for the active low pulse from 1 second to 99 hours 59 minutes and 59 seconds (pulse width). This is the period of time for which the output will remain on.

Select *Start* (START) to begin outputting the constant timed pulse.

Select *Stop* (STOP) to end outputting the constant timed pulse.

Function keys or the digital input may be assigned to start and stop timer functions (see the USER menu in *Advanced*).

Stopwatch (STPWATCH)

The stopwatch function may be used to manually run and control a process for a specific time interval up to 99 hrs, 59 min, and 59 seconds. The stopwatch function may be assigned to any open collector. There are three settings needed to use the function effectively.

1. Assign stopwatch to either top or bottom display line
2. Assign the open collector or relay to control the process (on/off)
3. Assign a function key or digital input to start/stop the stopwatch

Application Example

To maintain consistency of a product, it is necessary to take and test samples at different times throughout the day. The stopwatch function is used to open and close a solenoid valve to know the exact amount of time needed to complete the desired sample. Once this is determined, the timer function can be used to automatically take a sample (batch) based on the time determined using the stopwatch function.

Setup: Assign the following to *Stopwatch Function*

- Bottom display line
  (see pages 29 & 30 for details how to change the display)

- Relay 1
  (see pages 31 & 34 how to change Open Collector and or Solid State Relay functionality)

- F3: Start/Stop
  (see pages 42 & 43 for details on how to change the function keys)

Procedure

- Press F3 to start the stopwatch; relay 1 turns on and the process starts running.

- Press F3 to stop the stopwatch; relay 1 turns off and the process stops.

- The bottom display indicates the time it took to complete the sample.

Solid State Relay Outputs (RELAY)

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

Alarms are available based on the rate, total, grand total, or the digital input. The alarm status will show on the display even if the output is not wired.

Sample will engage the relay for a programmed period of time when either the total or the grand total have reached a programmed amount.

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.

For use in batch control applications, the meter relays must be set to batch. This will enable the batch control features of the meter.

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.
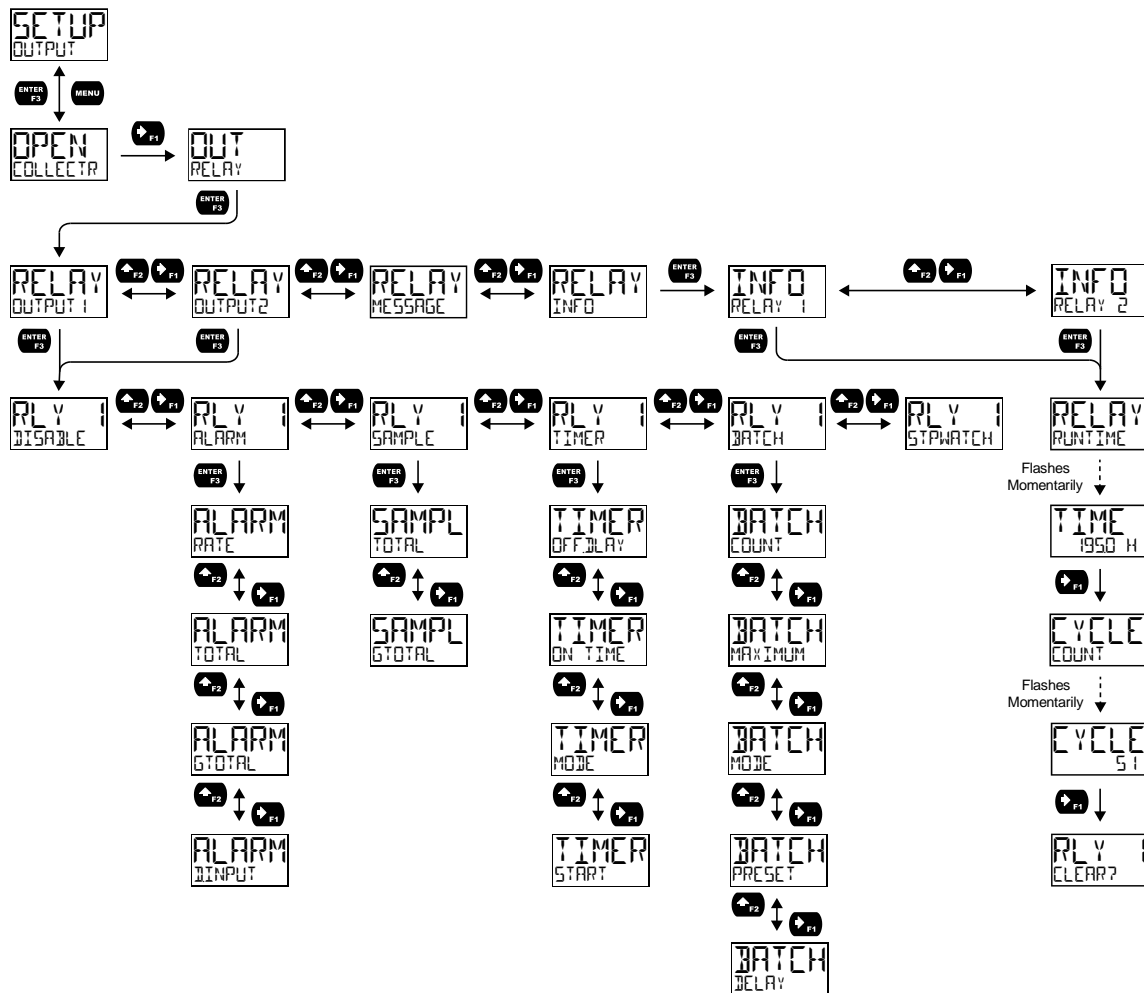
Alarm (ALARM)

Alarm outputs may be assigned to the rate, total, grand total, or the digital input. When assigned to the rate, the alarm may be set as either a high alarm or a low alarm. Alarm actions (AUTO, AUTOMAN, LATCH, L-CLEAR) determine how and when the alarm should be reset. They operate as follows:

- **Automatic (AUTO):** Alarm will reset automatically once the alarm condition has cleared.
- **Automatic/Manual (AUTOMAN):** Alarm will reset automatically once the alarm condition has cleared but can also be reset using the **Enter** button (or whichever function key is set to acknowledge).
- **Latching (LATCH):** Alarm will **not** reset automatically even if the alarm condition has cleared. Press the **Enter** button at any time to acknowledge the alarm.
- **Latching with Reset after Clear (L-CLEAR):** Alarm must be reset manually and can only be done so after the alarm condition has cleared. Press the **Enter** (ACK) button after the alarm condition has cleared to reset the alarm.

If the alarm is set to rate, a set and reset point must be programmed. The set point is the display value at which the alarm will turn on and the reset point is the display value at which the alarm will turn off. If the set point is lower than the reset point, the alarm will be a low alarm; if the set point is higher than the reset point, the alarm will be a high alarm. If the alarm is set to total or grand total, only a set point needs to be programmed. The digital input alarm will trigger whenever the digital input is triggered.

For all alarms, a delay before the alarm is turned on or off may be set, as well as a failsafe feature which will inverse the on/off programming.
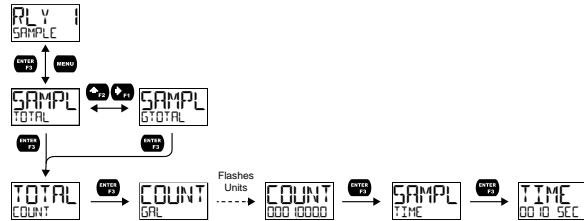
Alarm states will be displayed on the meter even if no relay output is physically connected. The alarm indicator (!) (only on meters with no bargraph) will display as well as optional red LED backlight, flashing rate, total, or grand total value (rate, total, or grand total alarms only), and a programmable alarm message.
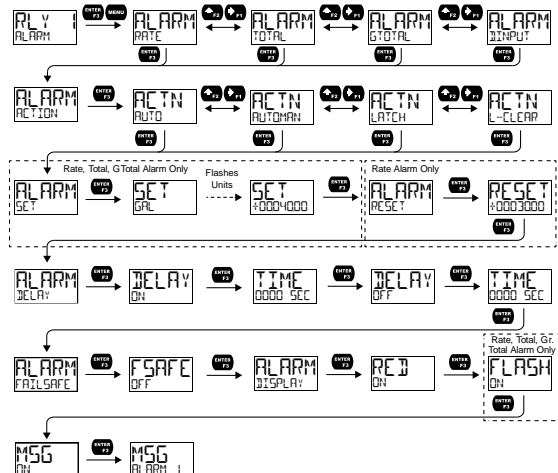
Sample (SAMPLE)

A relay set to sample will trigger when the total or grand total value has incremented by a programmed amount. The relay can be programmed to stay on for a specified amount of time.

For example: if a relay is set to sample the total with a COUNT of 1,000 and a TIME of 10 seconds, the relay will engage for 10 seconds whenever the total has incremented by 1,000 (e.g. 1000, 2000, 3000).

Timer (TIMER)

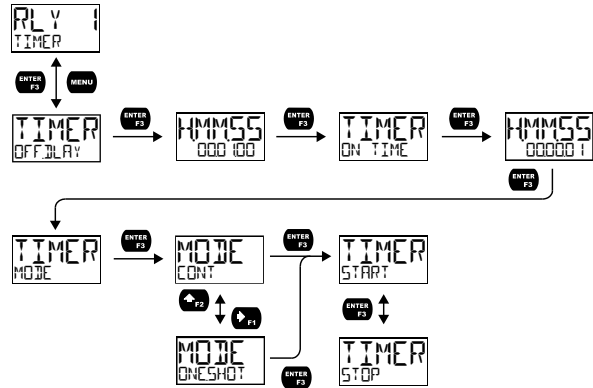The timer output may be set to generate the timed pulse only once (ONESHOT) or continuously (CONT).

The timer output produces a constant width pulse at a constant frequency, if set as continuous timer. Program the *Off Delay* (OFF.DLAY) from 1 second to 99 hours 59 minutes and 59 seconds. This is the time it takes from selecting START to turning on the output and for how long the output is off in continuous mode.

Program the *On Time* (ONTIME) for the active low pulse from 1 second to 99 hours 59 minutes and 59 seconds (pulse width). This is the period of time for which the output will remain on.

Select *Start* (START) to begin outputting the constant timed pulse.

Select *Stop* (STOP) to end outputting the constant timed pulse.

Function keys or the digital input may be assigned to start and stop timer functions (see the USER menu in *Advanced*).
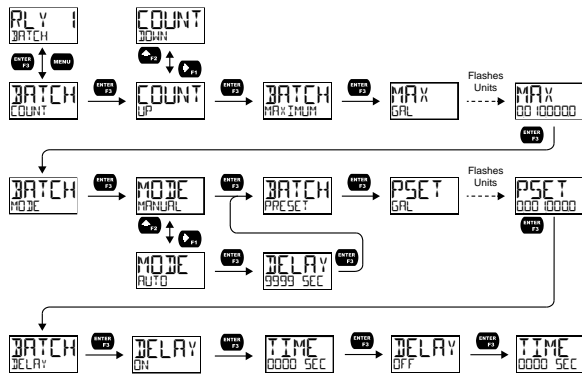

35

Batch Control (BATCH)

Selecting batch control for relay 1 will enable batching features on the meter. The top display will be changed to show the total and the bottom display will be changed to display the preset batch amount. The function keys will be changed so that F1 starts a batch, F2 opens the preset menu to allow the preset value to be changed, and F3 stops the currently running batch. Enabling batch control for relay 1 will allow access to the BATCH menu under relay 2 (this menu does not appear by default).

Batch Control Relay 1

The batch total can be set to count UP or DOWN. The batch MAXIMUM is the max preset amount that can be batched. Batching can be set to either manual or automatic operation (MANUAL or AUTO). If setting batching to automatic, a delay before the next batch is started must be programmed. The PRESET amount is the value at which the batch will stop and can be programmed up to the value assigned in the MAXIMUM menu. An on and off delay may be set for batching relays.

Batch Control Relay 2

The BATCH option only appears under relay 2 if relay 1 has also been set to batch control. The second relay may be programmed as a preclose relay or as another batching relay with its own preset amount.

Stopwatch (STPWATCH)

The stopwatch function may be used to manually run and control a process for a specific time interval up to 99 hrs, 59 min, and 59 seconds. The stopwatch function may be assigned to any relay. There are three settings needed to use the function effectively.

1. Assign stopwatch to either top or bottom display line

2. Assign the open collector or relay to control the process (on/off)

3. Assign a function key or digital input to start/stop the stopwatch

Application Example

To maintain consistency of a product, it is necessary to take and test samples at different times throughout the day. The stopwatch function is used to open and close a solenoid valve to know the exact amount of time needed to complete the desired sample. Once this is determined, the timer function can be used to automatically take a sample (batch) based on the time determined using the stopwatch function.

**Setup:** Assign the following to *Stopwatch Function*

- Bottom display line
  (see pages 29 & 30 for details how to change the display)

- Relay 1
  (see pages 31 & 34 how to change Open Collector and or Solid State Relay functionality)

- F3: Start/Stop
  (see pages 42 & 43 for details on how to change the function keys)

Procedure

- Press F3 to start the stopwatch; relay 1 turns on and the process starts running.

- Press F3 to stop the stopwatch; relay 1 turns off and the process stops.

- The bottom display indicates the time it took to complete the sample.

Runtime & Cycle Count (INFO)

The relay information menu shows runtime and cycle count for each relay. These values may be cleared at any time by selecting the *Clear* option (CLEAR?).

36
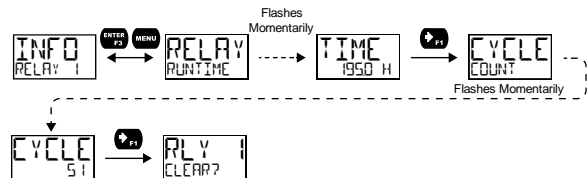
Isolated 4-20 mA Output (4-20 mA)

The *4-20 mA* menu is used to scale the 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 (if equipped) can be scaled to provide a 4-20 mA signal for the rate or total 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.
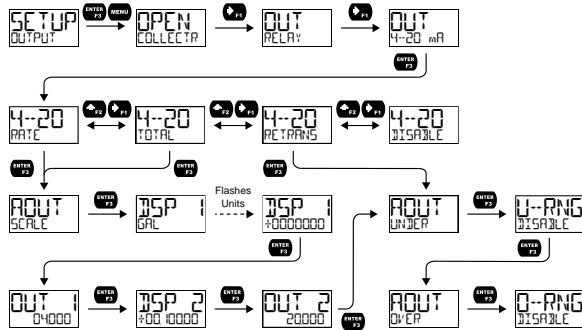
Rate or Total (RATE or TOTAL)

To scale the analog output, enter display value 1 and a corresponding analog output value for this display, then enter display value 2 and a corresponding analog output value for this display value. This will provide a linearly scaled analog output.

Retransmit (RETRANS)

This option will retransmit the 4-20 mA analog input without the need to scale the output.

Output Manual Control (CONTROL)

The *Control* menu is used to control the open collector outputs, 4-20 mA analog output, or the relays manually, ignoring the input. Each open collector, relay, and analog output can be programmed independently for manual control. Selecting automatic control sets all relays and analog output for automatic operation.

After selecting manual control for a specific output, you can set the output value. To change the output value, return to the Control menu, select the output to control, select manual control, and enter a new input.
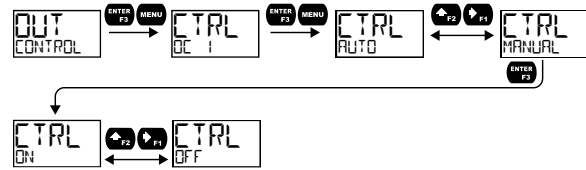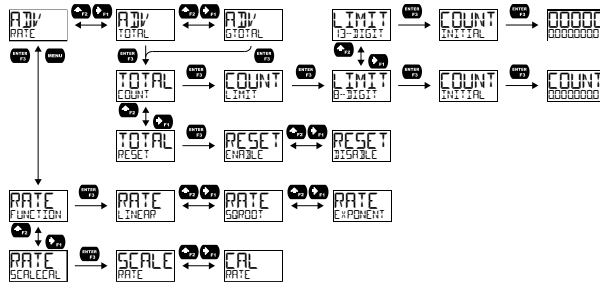
Advanced Features Menu (`ADVANCED`)

To simplify the setup process, functions not needed for most applications are located in the *Advanced Features* menu. The options under advanced features include *advanced rate, total, and grand total setup*, *cutoff*, *filter*, *password*, *function key programming*, and *system settings*.
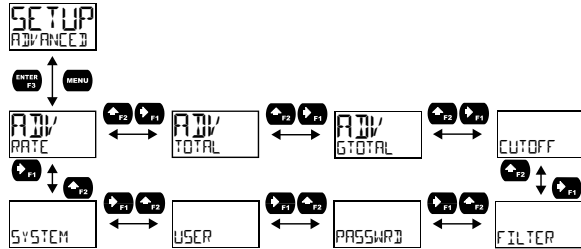
Advanced Rate, Total, and Grand Total Setup (`ADV RATE`, `TOTAL`, `GTOTAL`)

The *Advanced Rate* menu contains options to apply input signal conditioning functions to the input and scale/calibrate the input signal. The *Advanced Total* and *Advanced Grand Total* menus contain the settings for count up or count down, total limits, initial count, and manual reset.
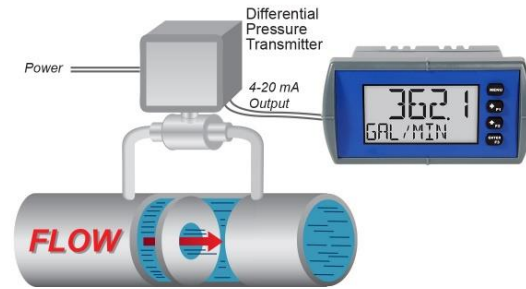

Input Signal Conditioning Functions (`FUNCTION`)

The *Function* menu is used to select the input signal conditioner applied to the input: linear, square root, programmable exponent, or round horizontal tank volume calculation. Multi-point linearization is part of the linear function selection.
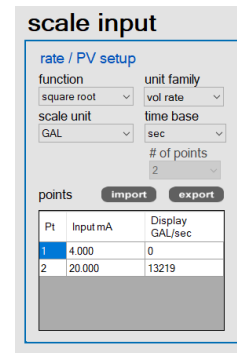
Meters are set up at the factory for linear function with 2-point linearization. The linear function provides a display that is linear with respect to the input signal.
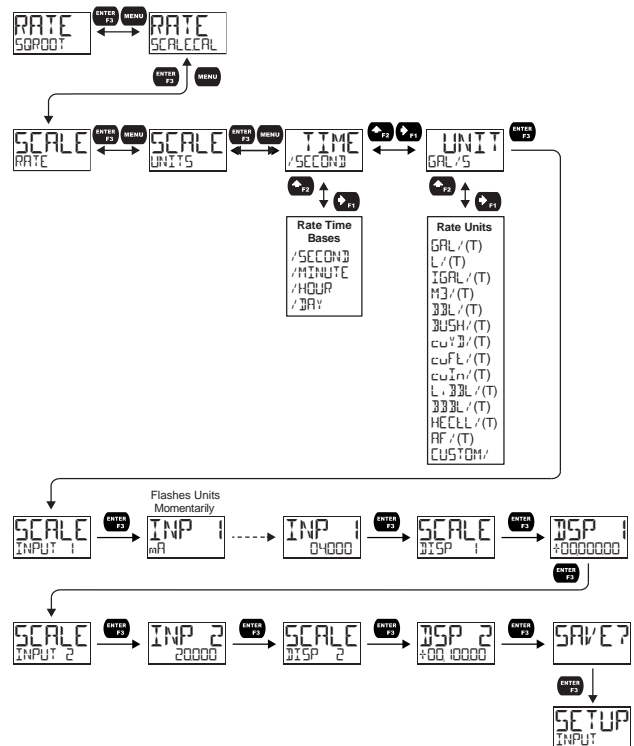
Square Root Linearization (`SQROOT`)

The square root function can be used to linearize the signal from a differential pressure transmitter and display flow rate in engineering units.

PD6622 Displaying Flow Rate by Applying the Square Root Function to the Output of a DP Transmitter.
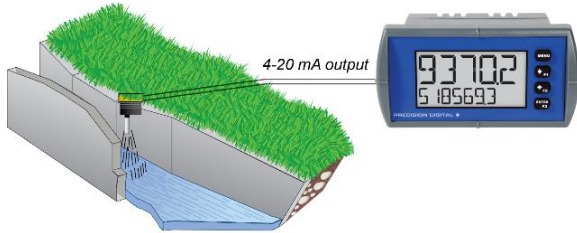

MeterView XL Square Root Function Setup

Programmable Exponent Linearization (EXPONENT)

The programmable exponent can be used to linearize the signal from level transmitters in open-channel flow applications using weirs and flumes.

4-20 mA output

The PD6622, in combination with an ultrasonic level transmitter, makes for an economical way to measure and display open channel flow rate and total in most weirs and flumes. A guide such as the ISCO Open Channel Flow Measurement Handbook can provide the user with all the information needed: the exponent used in the flow equation for the desired flow units and the flow rate for any given head height.

For example, to display the open channel flow rate from a 3" Parshall flume, the ISCO handbook advises the exponent is 1.547 and at the maximum head height of 3.0 feet, the flow rate is 3.508 MGD.

3" Parshall Flume Discharge Table

Formula:

CFS	$= 0.9920\ H^{1.547}$
GPM	$= 445.2\ H^{1.547}$
MGD	$= 0.6411\ H^{1.547}$

Where: H = Head in feet

Table 12-3

Head (Feet)	CFS	GPM	MGD
3.00	5.428	2436	3.508

ISCO Open Channel Flow Measurement Handbook, 3rd edition

With this information the PD6622 should be programmed in the following fashion. This setup assumes the level transmitter is programmed to output 20 mA at the maximum head height of 3.00 feet; but any mA value at a head height with a known flow rate may be used.

Function	Desired	Programming
Open Channel Flow	3" Parshall flume	Set Programmable Exponent to 1.547
Flow Rate	Millions of Gallons per Day (MGD)	Set 4 mA = 0 20 mA = 3.508 Time base = Day
Total	Millions of Gallons	Set Totalizer Conversion Factor = 1 (password protect "total" to avoid accidental reset)
Non-Resettable Grand Total	Program meter so grand total can never be reset	Set non-resettable grand total password
Display	Display Flow Rate, Total, and Grand Total	Set upper display for Grand Total and lower display to toggle between rate and total.

The Programmable Exponent function is programmed in the following manner:
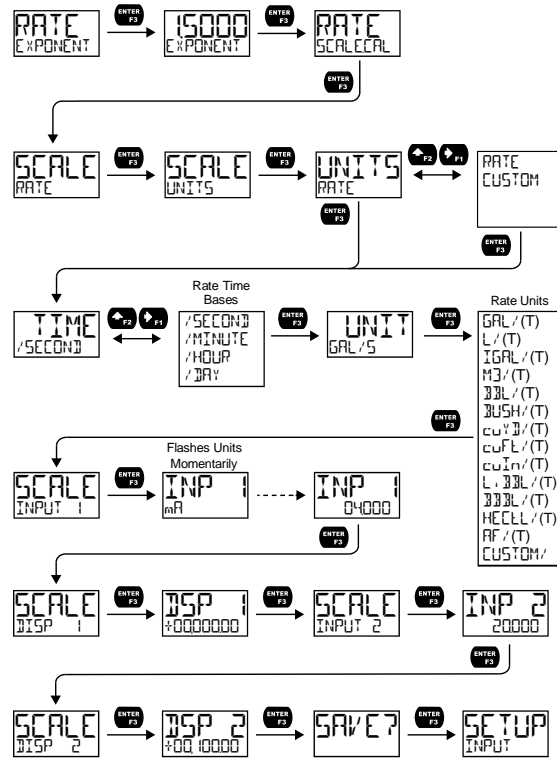
Multi-Point Linearization (LINEAR)

Up to 32 linearization points can be selected for rate under the LINEAR function. Multi-point linearization can be used to linearize the display for non-linear signals such as those from level transmitters used to convert level to flow using weirs and flumes with complex exponent. These points are established via direct entry (SCALE) or with a live calibration signal source (CAL).
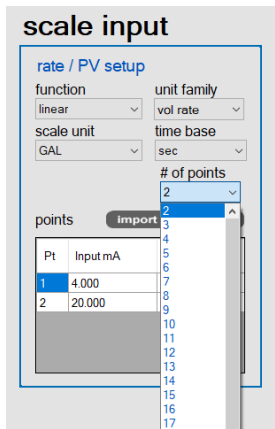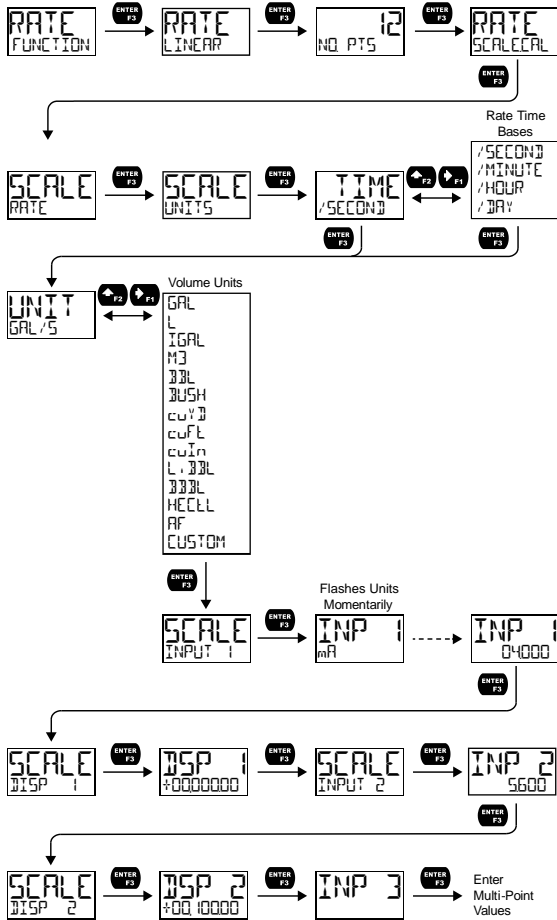
MeterView XL showing the linear points setup feature. Up to 32 points can be selected.

Advanced Total and Grand Total Programming (ADV TOTAL & ADV GTOTAL)

The advanced total and grand total menu contain the count (COUNT) and reset (RESET) menus. The count menu allows the digit limit to be selected between 8-digit (bottom display only) and 13-digit (uses top and bottom display to display full number) and the initial value at which the total or grand total should start counting.

When using a 13-digit total or grand total, press the function key assigned to display (default: F1) to view the full amount once the value has exceeded 100,000,000 (decimal places are automatically truncated). If a 13-digit total or grand total is displayed on the bottom display and the value has exceeded eight digits, the truncated value will flash to indicate that it is not the complete value. To display 13-digit grand total, assigned the top and bottom display to grand total.

The reset menu is used to enable or disable the reset of the total and grand total.

Non-Resettable Grand Total

The grand total reset may be permanently disabled by selecting YES at the PERMLOCK menu after disabling grand total reset.
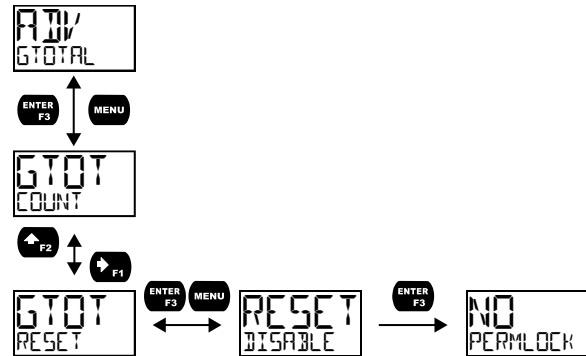
> ⚠️ **CAUTION**

- **Use caution** when selecting the PERMLOCK feature as, once grand total reset has been permanently locked, it cannot be unlocked.

Advanced Scaling and Calibration (SCALECAL)

This menu offers options to scale or calibrate the meter.

Scaling the Input (SCALE)

The scale menu in the *Advanced* menu is the same as the scale menu in the *Input* menu. See *Scaling the 4-20 mA Input* (INPUT) on page *27* for details about scaling the meter.

Calibrating the Input (CAL)

> To scale the meter without a signal source, refer to *Scaling the 4-20 mA Input* (INPUT), page *27*

The meter can be calibrated to display the process in engineering units by applying the appropriate input signal and following the calibration procedure. The CAL menu should be used with a live signal coming from a 4-20 mA transmitter connected to the process being measured.

During calibration, the mA input value will be displayed as INP 1 and INP 2. Adjust the input source until the desired mA value is shown. The use of a calibrated signal source is strongly recommended.
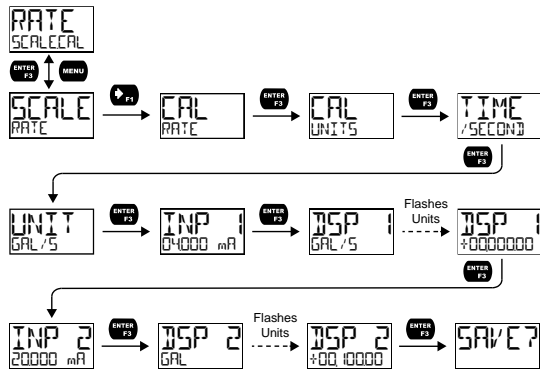

1. After accessing the SCALECAL menu, press the **Right-Arrow** button to scroll to the *Calibration* menu (CAL RATE) and press *Enter*.
2. Select the appropriate units for the desired process variable, then press **Enter**. For information on units, see Available Engineering Units on page *28*.
3. The meter displays INP 1. Apply a known signal and press **Enter**. The display will flash while accepting the signal.
4. After the signal is accepted, the meter displays DSP 1. Enter a corresponding display value for the input signal , and press **Enter** to accept.
5. The meter displays INP 2. Apply a known signal and press **Enter**. The display will flash while accepting the signal.
6. After the signal is accepted, the meter displays DSP 2. Enter a corresponding display value for the input signal and press **Enter** to accept.
7. After completing calibration, the SAVE? display will need to be acknowledged using the **Enter** key before calibration will take effect.

Additional Engineering Units

> ⚠ **IMPORTANT**
>
> • If the total is disabled and the dual-scale level feature has been selected, the menus for PV1 & PV2 are enabled.
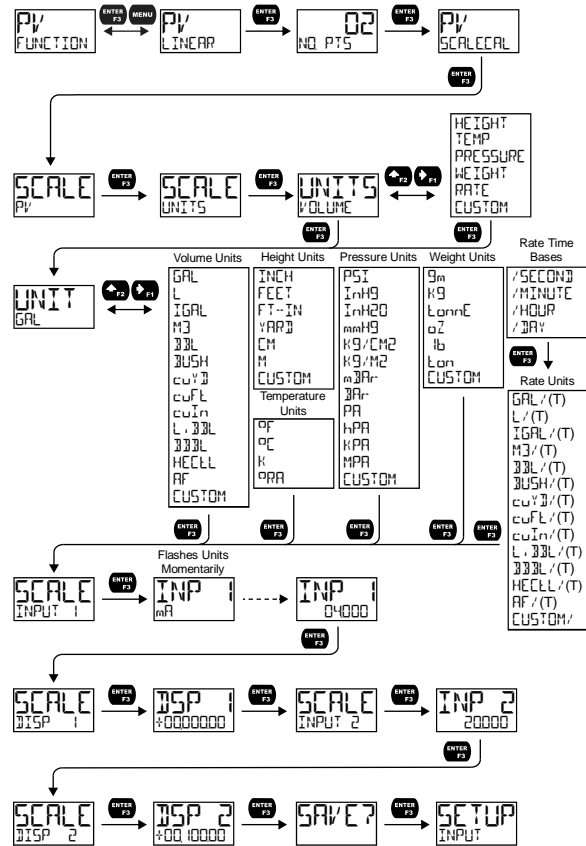
Low-Flow Cutoff (CUTOFF)

The low-flow cutoff feature allows the meter to be programmed so that the often-unsteady output from a differential pressure transmitter at low flow rates always displays zero on the meter.

The cutoff value may be programmed from 0.1 to 99999. The meter will display zero below the cutoff value. The cutoff can be disabled to display negative values.

Noise Filter (FILTER)

The noise filter is available for unusually noisy signals that cause an unstable process variable display. The noise filter averages the input signal over a certain period. The filter level determines the length of time over which the signal is averaged. The filter level can be set between 1 and 16 seconds or turned off. The higher the filter level, the longer the averaging time and so the longer it takes the display to settle to its final value. Setting the filter level to off disables the filter function.

Noise Filter Bypass (BYPAS)

The noise filter bypass changes the behavior of the meter so that small variations in the signal are filtered out but large abrupt changes in the input signal are displayed immediately. The bypass value determines the minimum amount of signal change to be displayed immediately. All signal changes smaller than the by-pass value are filtered or averaged by the meter. The noise filter bypass may be set between 0.0 and 99.9% of full scale.

Enabling Password Protection (PASSWRD)

The *Password* menu is used for programming security to prevent unauthorized changes to the programmed parameter settings. There are three password types available: *Main*, *Total*, and *Grand Total*. The *Main* password prevents access to the meter *Programming Mode*. *Total* and *Grand Total* passwords prevent re-setting of and changes to the total and grand total, re-spectively.

To set a password, enter the *Password* menu and program a five-digit password. When the *Main* pass-word has been enabled, the lock icon will display in the lower right of the display (PD6622/26 only).

For instructions on how to program numeric values see *Setting Numeric Values*, page *27*.
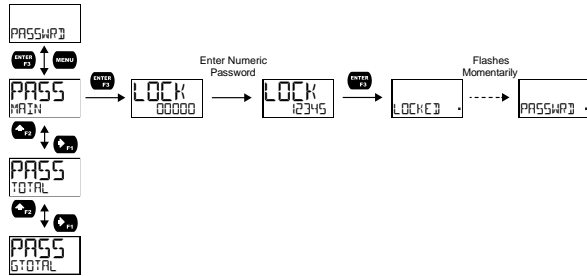
Making Changes to a Password Protected Meter

If the *Main* password is enabled, the meter will display the message LOCKED when the *Menu* button is pressed. If the *Total* or *Grand Total* passwords are enabled, the meter will display the message LOCKED when trying to reset or change the total or grand total. Press the *Enter* button while the message is being displayed and enter the correct password to gain access to the menu. After exiting *Programming Mode*, the meter returns to its password protected condition.

Disabling Password Protection

To disable the *Main, Total, or Grand Total* passwords, access the *Password* menu and clear the desired password either by pressing and holding the **Right Arrow** button until all digits reset to zero or manually changing all of the digits to zero. When the **Enter** button is pressed, the meter will display UNLOCKED and will no longer require a password to access *Programming Mode*, or a password to reset or change the total or grand total, depending on which password was cleared.

Note: If the meter is password protected and the password has been forgotten, the password may be overridden using the master password: **50865**

Programmable Function Keys User Menu (USER)

The *User* menu allows the user to assign the front panel function keys F1, F2, and F3, and the digital in-put (a digital input located on the input signal con-nector) to access some of the menus or to activate certain functions immediately (e.g. reset max & min, hold relay states, etc.). This allows the meter to be greatly customized for use in specialized applications.
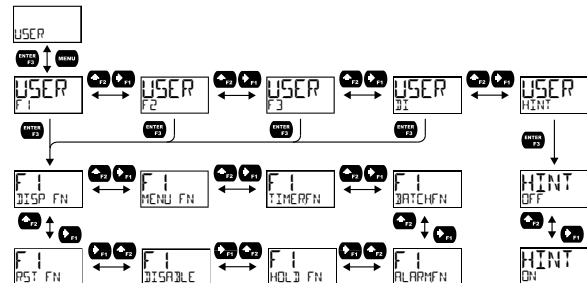
Function Keys & Digital Input Available Settings

Refer to the following table for descriptions of each available function key or digital input setting.

Display	Description
DISP FN	Set the function key or digital input to display a value
DISPLAY	Cycle max, min, rate, total, and grand total
D RATE	Display the rate
D TOTAL	Display the total
DISP GT	Display the grand total
PCTRATE	Display the rate's percentage of max (20 mA)
D UNITS	Display rate, total, and grand total units
D TAG	Display the tags
DISPMIN	Display the minimum rate value
DISPMAX	Display the maximum rate value
MIN MAX	Display the minimum and maximum rate value
D mA IN	Display the current mA input value
D mAOUT	Display the current mA output value
MENU FN	Set the function key or digital input to access a menu
RLYINFO	Go to relay information menu (INFO)
MANCTRL	Go to output control menu (CONTROL)
TIMR OC1	Open collector 1 timer
TIMR OC2	Open collector 2 timer
TIMER R1	Relay 1 timer
TIMER R2	Relay 2 timer
TIMERFN	Set the function key or digital input to start or stop a timer
STRTALL	Start all timers
STOPALL	Stop all timers
SSTPALL	Start or stop all timers
OC1	Start/stop open collector 1 timer
OC2	Start/stop open collector 2 timer
RLY1	Start/stop relay 1 timer
RLY2	Start/stop relay 2 timer

| Display	Description
START	Start the selected timer output
STOP	Stop the selected timer output
STR--STP	Start or stop the selected timer output
BATCHFN	Set the function key or digital input to batch control
START	Start a batch
STOP	Stop a batch
STR--STP	Start or stop a batch
PRESET	Preset batch amount
ALARMFN	Set the function key or digital input to acknowledge an alarm
ACK	Acknowledge all active alarms
SETPOINT	Set all output set points
SETPTOC1	Set open collector 1 set point
SETPTOC2	Set open collector 2 set point
SETPTR1	Set relay 1 set point
SETPTR2	Set relay 2 set point
SWATCHFN	Set the function key or digital input to activate stopwatch
START	Start the stopwatch
STOP	Pause/Stop the stopwatch
STR--STP	Start or stop the stopwatch
HOLD FN	Set the function key or digital input to hold an output
HOLDOUT	Hold all outputs
HLDUNHLD	Hold or un-hold all outputs
OC 1+2	Hold/un-hold open collector outputs
RLY 1+2	Hold/un-hold relay outputs
mAOUT	Hold/un-hold 4-20 mA output
HOLD	Hold selected output
HLDUN--HLD	Hold or un-hold selected output
DISABLE	Disable function key or digital input
RST FN	Set the function key or digital input to reset a value
RESET	Reset min, max, or max/min rate value
R MINMAX	Reset max and min rate value
RST T	Reset the total
RST GT	Reset the grand total
RST TGT	Reset the total and grand total

Enabling the Function Key Hint Feature (HINT)

Enabling the function key hint feature will cause a hint message to be displayed when pressing the F1, F2, or F3 function keys. This text gives a brief description of what the button is programmed to do. Pressing that function key a second time will execute that action.

The hint feature does not affect the digital input (DI) which is intended for immediate execution.

Changing System Settings (SYSTEM)

The System menu contains the following menus: Analog Output Calibration, Restore Factory Defaults, Totalizer, Backlight, Information, and Internal Calibration.
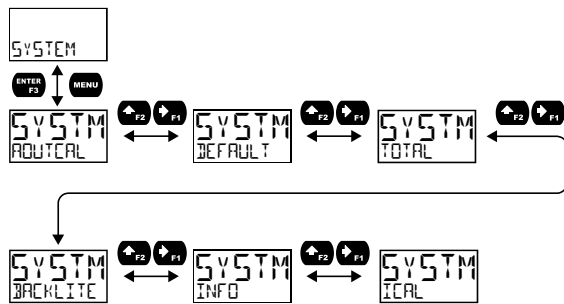
Analog Output Calibration (AOUTCAL)

To perform the analog output calibration, it is recommended to use a milliamp meter with a resolution of at least 0.1 µA to measure the output current. The values saved internally during this procedure are used for scaling the 4-20 mA output in the *Setup* menu.

4-20 mA Output Calibration Procedure

1. Go to the *Advanced Features* menu and navigate to the SYSTEM menu and press Enter. Navigate to AOUTCAL and press Enter.

2. The display will show 4 mA. The Loop Leader mA output should now be close to 4 mA. Enter the actual value read by the digital mA meter on the second line of the display and press Enter.

3. The display will show 20 mA. The Loop Leader mA output should now be close to 20 mA. Enter the actual value read by the digital mA meter on the second line of the display and press Enter.

4. The Loop Leader will now calculate the calibration factors and store them.

5. Press Menu to exit.

Enabling or Disabling the Backlight (BACKLITE)

The backlight may be enabled or disabled using the Backlight menu. The backlight is enabled by default, but the input must be wired appropriately for the backlight to function. See *Safe Area Current Loop (4-20 mA) Connections* on page *20*. The voltage drop is the same if the backlight is not wired or if it is disabled in the *System* menu.

Viewing System Information (INFO)

System information, such as software (firmware) number and version, model number, and system tag, may be viewed in the INFO menu. Press the **Right Arrow** button to cycle through all available meter information. Press **Menu** to go back to the previous menu.

Calibrating the Internal mA Reference (ICAL)

The meter is factory calibrated prior to shipment to display 0 to 100, which corresponds to the 4-20 mA input. The calibration equipment is traceable to NIST standards.

The use of calibrated signal sources is necessary to calibrate the internal source of the meter. The meter's internal source is what allows the user to scale the meter without applying a signal.

Check calibration of the meter at least every 12 months.

Note: Allow the meter to warm up for at least 15 minutes before performing the internal source calibration procedure.

The *Internal Calibration* menu is part of the *Advanced* menu. Internal Calibration is performed as follows:

1. Press the **Menu** button to enter *Programming Mode.*
2. Press the **Up-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 **Up-Arrow** button and press **Enter** to access the **ICAL** menu.
5. The meter displays *low* input current message (4000 mA). Apply a 4 mA signal and press **Enter**. The display flashes for a moment while the meter is accepting the low input signal.
6. After the display stops flashing, the display moves to the *high* input calibration (20000 mA). Apply the high input signal and press **Enter**. The display will flash again while the meter is accepting the high input signal.
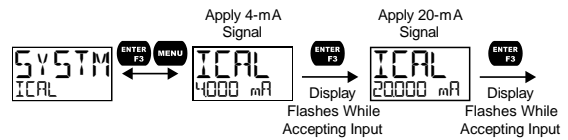
Meter Operation

The meter can accept a 4-20 mA current signal and display it in engineering units from -9999 to 99999 on the top display and the total from 0 to 99,999,999 (with commas, if desired) on the bottom display. For example, a 4-20 mA signal could be displayed as -50.00 to 50.00 on the top display.

The dual-line display can be customized to display the process variable and other parameters in a wide variety of ways. Typically, the top display is used for the flow rate while the bottom display is used for total, grand total, engineering units, custom tag, or process variable percentage of full scale.

If the total is disabled, the 4-20 mA input can be scaled to display the process in two different scales; for example: with *PV2* enabled, the top display could indicate level in feet and the bottom display could indicate the volume in gallons.

Front Panel Buttons Operation

Button Symbol	Description
MENU	Press to enter or exit *Programming Mode*, view settings, or exit max/min readings
F1	Press to display max/min readings or other parameter/function assigned through the *User* menu
F2	Press to reset max/min readings or other parameter/function assigned through the *User* menu
ENTER F3	Press to acknowledge alarms or other parameters/function assigned through the *User* menu

Function Keys Operation

During operation, the programmable function keys operate according to the way they have been programmed in the *Advanced Features – User* menu. The table above shows the factory default settings for F1, F2, and F3.

A hint message may be enabled to provide a description of what each function key does prior to executing their assigned function. See *Enabling the Function Key Hint Feature* (HINT) on page *44*.

Digital Input Operation

A digital input is standard on the meter. This digital input is programmed identically to function keys F1, F2, and F3. The input is triggered with a contact closure between DI+ and DI-, or with an active low signal. During operation, the digital input operates according to the way it has been programmed in the *Advanced Features – User* menu.

Maximum/Minimum Readings

The max & min readings (peak & valley) reached by the process can be displayed either continuously or momentarily.

Display momentarily by pressing the F1 key (default) or assigning to any of the other function keys or to the digital input in the *User* menu.

Display continuously by pressing the **Enter** button while the max/min is being displayed to lock the display. Press **Enter** again to unlock.

Any of the F1-F3 function keys (buttons) and the digital input can be programmed to reset the max & min readings. The meters are set at the factory to display the max reading by pressing the *Right Arrow/F1* button and to use the *Up-Arrow/F2* button to access the *Reset* menu. Press the *Right Arrow* button to cycle through the available parameters to reset.

Top Display: Process Value
Bottom Display: Max & Min
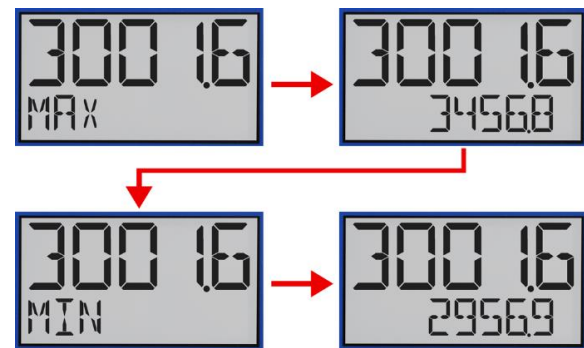
Controller Operation

Selecting batch control for relay 1 enables the batching features on the meter. The top display is changed to show the total and the bottom display is changed to display the preset batch amount. The function keys are changed so that F1 starts a batch, F2 opens the preset menu to allow the preset value to be changed, and F3 stops the currently running batch. Enabling batch control for relay 1 allows access to the batch menu under relay 2 (this menu does not appear by default).

Refer to page *48* for details to setup the batch controller features.

The PD6624 has two open collector outputs that can used for alarm indication. A 4-20 mA output option is also available for retransmitting the process variable.

Default Batch Control Operation

The following describes the operation of the three operating keys as programmed with default settings. The digital input can be used to start and stop the batch using a momentary pushbutton such as the PDA-BUTTON. See examples for *Manual Batch Control* on page *49* and *Automatic Batch Control* on page *50*.

START Key (F1)

Press the START button to begin a new batch process. Press the START button to resume a batch that has been stopped.

BATCH Key (F2)

Press the Batch button to access the Preset (batch amount) menu. Program the batch with the arrow keys, and confirm with the Enter key.

STOP Key (F3)

Press the STOP key once during a batch to pause. Press the STOP key while paused to stop and cancel the batch.

> ⚠ **WARNING**
>
> - **Only STOP Key Enabled if a Batch is Running.** During a batch process, only the pause/stop functions are operational, other keys are deactivated.

Batch Control Operation Example

The following example shows how two stage batch control functions with a PD6624. This setup will establish a 55 gallon preset for the batch, with a main valve (high flow) that will close at 50 gallons, and a trickle valve (low or restricted flow) that will close at 55 gallons. After the batch, the preset will be changed to 80 gallons.

Two-Stage Batch Control Setup Using Relays 1 & 2

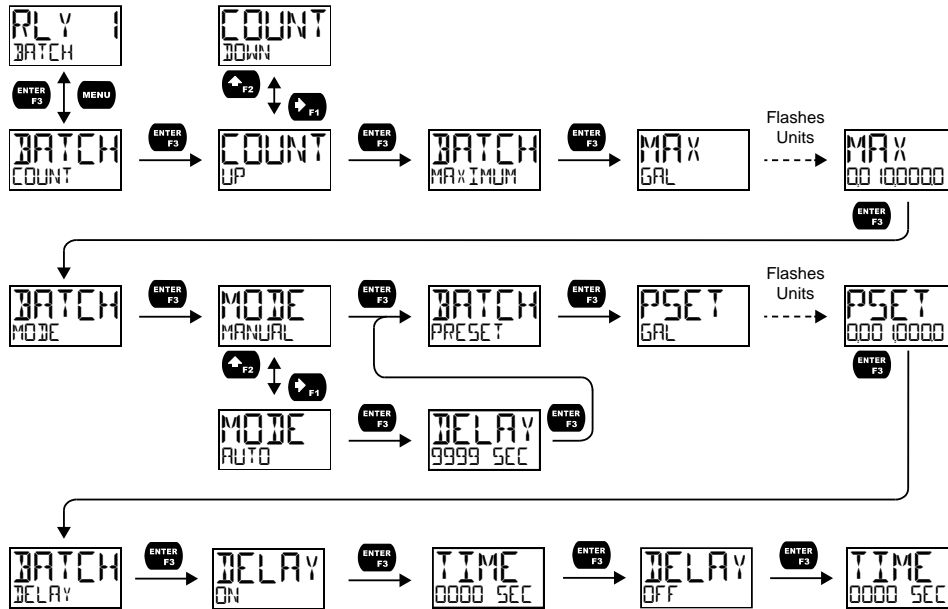The following table shows the parameters as they appear within the OUT RELAY menu.

Parameter	Setting	Function
RELAY OUTPUT 1	RLY 1 BATCH	Press Enter to assign relay 1 batch parameters.
BATCH COUNT	UP or DOWN	Setup batch to count up or down.
BATCH MAXIMUM	10000 GAL	This setting prevents the operator from entering a larger preset value.
BATCH MODE	MANUAL AUTO	Press Enter to select manual or automatic batch control.
BATCH PRESET	5000 GAL	Enter the batch size.
BATCH DELAY	ON & OFF	Enter the On & Off time delays for relay 1.
RELAY OUTPUT 2	RLY 2 BATCH	Press Enter to assign relay 2 batch parameters.
BATCH PRECLOSE	YES PRECLOSE 500	Set the pre-close value to 5 for closing the valve controlling relay 2 five gallons before reaching the preset.
BATCH DELAY	ON & OFF	Enter the On & Off time delays for relay 2.
RELAY MESSAGE	MSG RELAY 1	Enter a message to be displayed while relay 1 is on.
	MSG RELAY 2	Enter a message to be displayed while relay 2 is on.

If only one stage batch control is desired, do not assign relay 2 to batch.

The following pages show illustrations of how the above settings control the batch operation. The display assignment shown is the default.
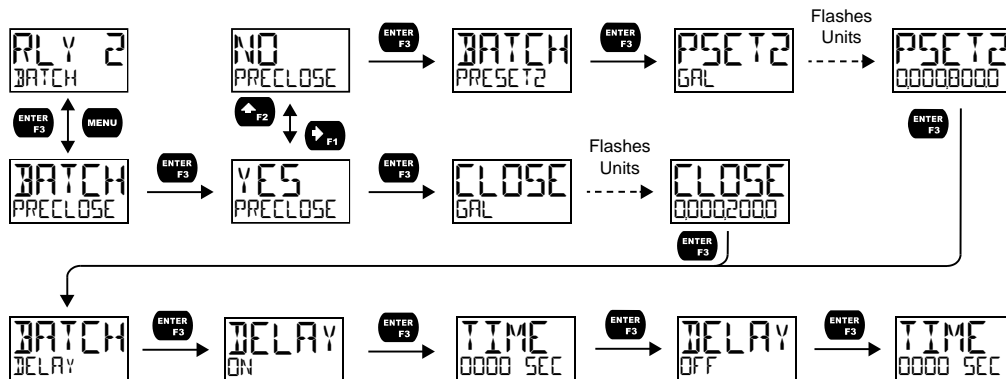
Batch Control Relay 1

The batch total can be set to count UP or DOWN. The batch MAXIMUM is the max preset amount that can be batched. Batching can be set to either manual or automatic operation (MANUAL or AUTO). If setting batching to automatic, a delay before the next batch is started must be programmed. The PRESET amount is the value at which the batch will stop and can be programmed up to the value assigned in the MAXIMUM menu. An on and off delay may be set for batching relays.

Batch Control Relay 2

The BATCH option only appears under relay 2 if relay 1 has also been set to batch control. The second relay may be programmed as a preclose relay or as another batching relay with its own preset amount.
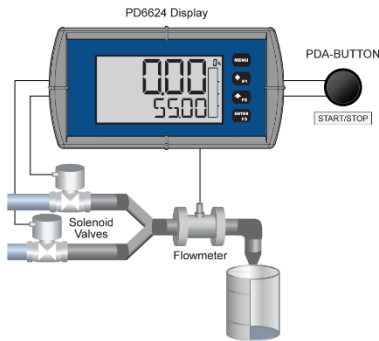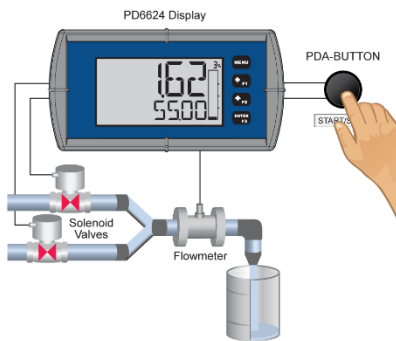
Manual Batch Control

The manual batch control feature is used for batch processes where the batch size needs to be manually adjusted for each batch. The PDA-BUTTON connected to the digital input can be used to start & stop the batch.
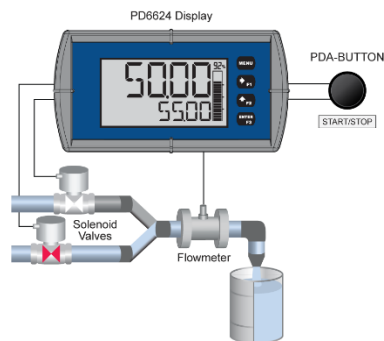
Manual Batch Control Operation

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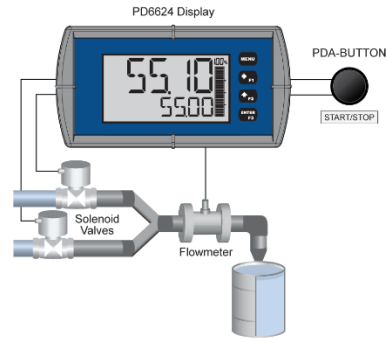

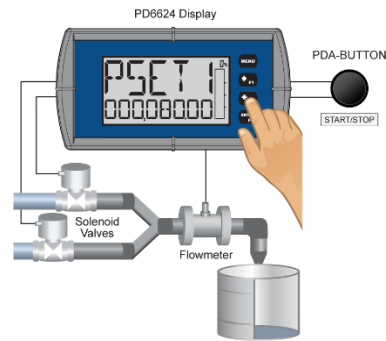2. The START button or (F1) is pressed. Both valves open. The barrel begins to fill.

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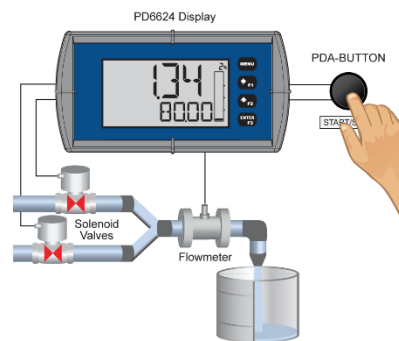

4. When the batch is complete, the restricted-flow valve closes. If overrun occurs, then the preset must be adjusted to compensate for the overrun amount (adjusted preset for the example below: 54.90), the next batch should be accurate (55.00).

5. After placing a new, empty barrel, a new preset fill amount may be selected with the Batch key (F2), while the process is stopped.

6. The new batch begins when the START button is pressed, so both relays activate and both valves open.
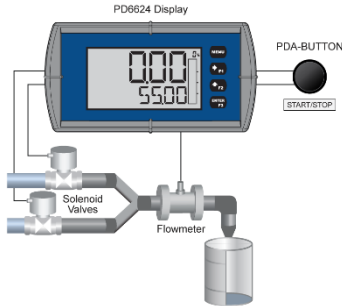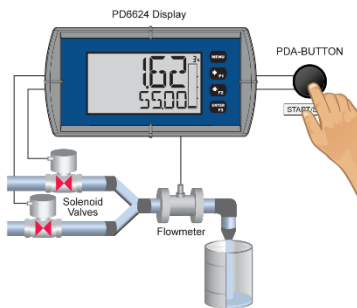

49

Automatic Batch Control

The automatic batch control feature is used for batch processes where the batch size does not change.
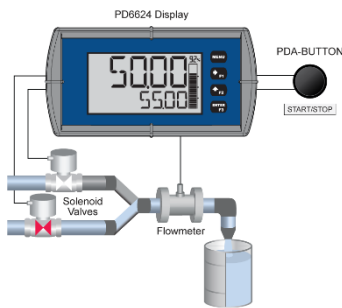
Automatic Batch Control Operation

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


2. The START button or (F1) is pressed. Both valves open. The barrel begins to fill.

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

4. When the batch is complete, the restricted-flow valve closes. If overrun occurs, then the preset must be adjusted to compensate for the overrun amount (adjusted preset for the example below: 54.90), the next batch should be accurate (55.00).
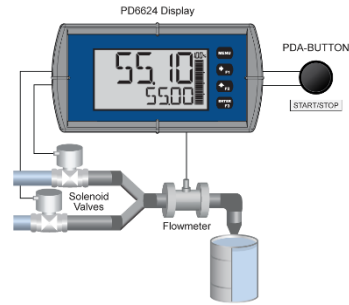
5. After the batch is completed, the operator removes the full barrel and places an empty barrel; the new batch starts automatically after 60 seconds (Time Delay).
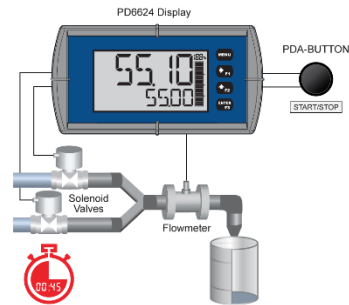
6. The new batch begins automatically after 60 seconds, both relays activate and both valves open.
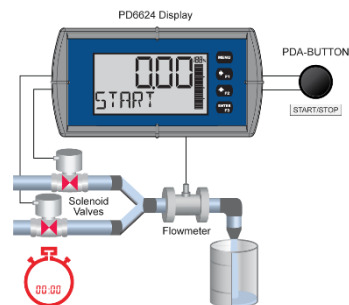
7. At the end of the shift, press STOP button or press (F3) twice to stop the batch process.

Runtime & Cycle Count (INFO)

The relay information menu shows runtime and cycle count for each relay. These values may be cleared at any time by selecting the *Clear* option (CLEAR?). If the cycle count or runtime values need to be changed on a frequent basis, it would be convenient to set up a front panel button or the digital input to simplify this process.
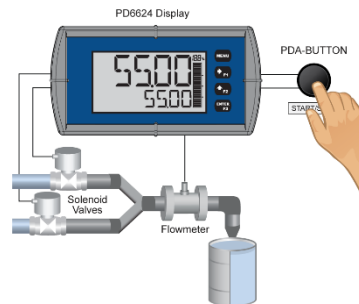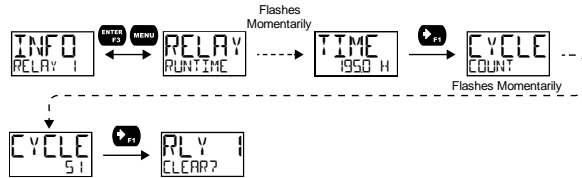

Note: See the menu tree under *Solid State Relay Outputs* (RELAY) on page *34* for complete menu structure on this feature.

Meter displaying the amount of time a relay has been activated	Meter displaying the number of times a relay has cycled

Changing Engineering Units

It is possible to change the display units without the need to re-scale the meter. The UNITS menu in the DISPLAY menu allows the unit of measure to be changed (e.g. from gallons/second (GAL/S) to liters/second (L/S)) and the meter will automatically convert the display values to the new unit of measure. If entering a custom unit (CUSTOM), a custom conversion factor will need to be entered. See *Changing the Engineering Units* (UNITS) on page *29*.

Disabling the Totalizer (TOTAL)

The totalizer can be disabled using the SYSTEM - TOTAL menu. With the totalizer disabled, the meter will behave as a PD6602 or PD6604 process meter. Refer to the [LIM6602 instruction manual](#) for instructions about programming a PD6602 or PD6604 process meter.

Troubleshooting

This product is a highly sophisticated instrument with an extensive list of features and capabilities. If the front panel buttons are used to program the meter, it can be a difficult task to keep everything straight. That is why we strongly recommend the use of the free MeterView XL software for all programming activities. A cable is provided to use the MeterView XL software for programming the meter.

If you have programmed the meter with the front panel buttons and it is not working as intended, try re-programming the meter using the MeterView XL software.

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.

To load factory defaults:

1. Press the *Menu* button to enter *Programming Mode*.

2. Press the *Up-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.
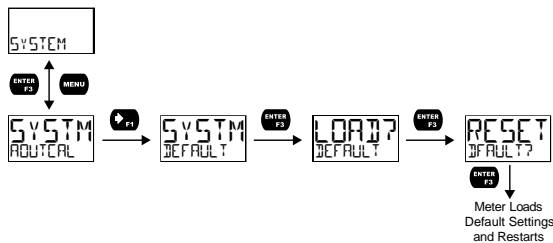
Determining Software Version

To determine the software (firmware) version of a meter:

1. Press the *Menu* button to enter *Programming Mode*.

2. Press the *Up-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 *Up-Arrow* button **twice** and press *Enter* to access the *Info* menu.

5. Press the *Right-Arrow* button to cycle through the meter information. When done, press the *Menu* button to return to the previous menu.

Factory Default Settings

The following table shows the factory setting for most of the programmable parameters on the meter.

Parameter	Display	Default Setting
Input Menu		
Rate Units	UNITS	Gallons/second
Input 1	INP 1	4.000 mA
Display 1	DSP 1	0.00
Input 2	INP 2	20.000 mA
Display 2	DSP 2	100.00
Output Menu		
Open Collector Output 1	OUTPUT 1	Disabled
Pulse Factor	FACTOR	1.0
Test Frequency	FREQ	100
Alarm	ALARM	Rate
Alarm Action	ACTION	AUTO
Set Point	SET	20.00
Reset Point	RESET	10.00
Alarm On Delay	DELAY ON	0 seconds
Alarm Off Delay	DELAY OFF	0 seconds
Alarm Failsafe	FAILSAFE	OFF
Red LED	RED	ON
Flash rate	FLASH	ON
Alarm Message	MSG	ON
Message Text	MSG EDIT	ALARM 1
Timer Off Delay	OFF.DLAY	1 minute
Timer On Time	ON TIME	1 second
Timer Mode	MODE	Continuous
Open Collector Output 2	OUTPUT 2	Disabled
Set Point	SET	40.00
Reset Point	RESET	30.00
Message Text	MSG EDIT	ALARM 2
Relay Output 1	RELAY 1	Disabled
Alarm	ALARM	Rate
Alarm Action	ACTION	AUTO
Set Point	SET	70.00
Reset Point	RESET	60.00
Alarm On Delay	DELAY ON	0 seconds
Alarm Off Delay	DELAY OFF	0 seconds
Alarm Failsafe	FAILSAFE	OFF
Red LED	RED	ON
Flash rate	FLASH	ON
Alarm Message	MSG	ON
Message Text	MSG EDIT	ALARM 3
Sample Count	TOTAL COUNT	1,000 gallons

Parameter	Display	Default Setting
Sample Time	TOTAL TIME	10 seconds
Batch Count	BATCH COUNT	Up
Batch Max	BATCH MAXIMUM	10,000
Batch Mode	BATCH MODE	Manual
Batch Preset	BATCH PRESET	1,000
Batch On Delay	DELAY ON	0 seconds
Batch Off Delay	DELAY OFF	0 seconds
Timer Off Delay	OFF.DLAY	1 minute
Timer On Time	ON TIME	1 second
Timer Mode	MODE	Continuous
Relay Output 2	RELAY 2	Disabled
Set Point	SET	90.00
Reset Point	RESET	80.00
Message Text	MSG EDIT	ALARM 4
4-20 mA Output	4-20 mA	Rate
Advanced Menu		
Signal Conditioning Function	FUNCTION	Linear (2 pts)
Count Limit	COUNT LIMIT	8-Digit
Count Initial	COUNT INITIAL	0
Total Reset	TOTAL RESET	Enabled
GTotal Reset	GTOT RESET	Disabled
Non-Resettable Grand Total	PERMLOCK	No
Low Cutoff	CUTOFF	Enabled: 0
Filter	FILTER	2.0 seconds
Filter Bypass	BYPAS	0.4 PCT
Main Password	MAIN	00000 (Unlocked)
Total Password	TOTAL	00000 (Unlocked)
GTot Password	GTOTAL	00000 (Unlocked)
Function Key 1	F1	Display
Function Key 2	F2	Reset
Function Key 3	F3	Acknowledge
Digital Input	DI	Reset Total
Function Key Hint Feature	HINT	Disabled
Totalizer	TOTAL	Enabled
Backlight	BACKLIGHT	Enabled
Display Menu		
Unit of Measure	UNITS	Gallons
Decimal Point Location	DECPT	Rate: 2; Total: 1; Grand Total: 0
Comma	COMMA	Enabled
Top Display	TOP	Rate
Bottom Display	BOTTOM	Total

Troubleshooting Tips

Certain sequences of events can cause unexpected results. To solve these issues, it is best to start fresh from factory defaults and use the manual as a step by step programming guide, rather than a random approach to programming. See *Reset Meter to Factory Defaults* on page *52* for details on resetting the meter to factory defaults. In addition, for best results, we recommend using the free MeterView XL software for all programming needs.

Symptom	Check/Action
No display at all	1. Check that the 4-20 mA current loop is providing at least 3.5 mA to the meter. 2. Check that 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.
Meter display flashes: 1. 99999 2. --9999	Check that the number of digits required for the scaled value does not exceed the maximum digits for the display line. If it does, try adjusting the decimal point location for less precision or changing the rate 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: MAX, MIN, RATE, TOTAL, or GTOT and a number	Max or min display has been locked. Press **Enter** to unlock 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.
Other symptoms not described above	Call Technical Support for assistance.

Contact Precision Digital

Technical Support

Call: (800) 610-5239 or (508) 655-7300

Fax: (508) 655-8990

Email: support@predig.com

Sales Support

Call: (800) 343-1001 or (508) 655-7300

Fax: (508) 655-8990

Email: sales@predig.com

Place Orders

Email: orders@predig.com

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