5 DIGIT LOOP-POWERED RATE/TOTALIZER
WITH LOOP-POWERED BACKLIGHT

Loop Leader® Series

Model PD684 General Purpose

Model PD689 Hazardous Area

FM APPROVED

CSA®

Model PD689 Only

- 4-20 mA Input
- 5 Digit LCD, 0.6" (15.2 mm) High
- Overflow Feature Displays Total up to 8 Digits
- Programmable Alternating Rate/Total Display
- FM Type 4X, IP65 Front
- Shallow Depth Case 3.2" Behind Panel
- 2 V Drop (5.7 V with Backlight)
- Loop-Powered Backlight Standard
- Custom Engineering Units & Bargraph
- Linear, Square Root, or Programmable Exponent
- Maximum & Minimum Display
- Operating Temperature Range -20 to 65°C
- Intrinsically Safe & Non-Incendive
- Open Collector Alarm or Pulse Output
- HART Protocol Transparent

- Trend Arrow
- 5 Digits, 0.6" High
- Bargraph
- Engineering Notation
- Custom Engineering Units
- Backlight is Standard

KEY FEATURES

Through significant innovation in technology and design, we developed the Loop Leader® Series of loop-powered rate/totalizers, which are loaded with standard features and built for tough industrial environments.

Full Featured

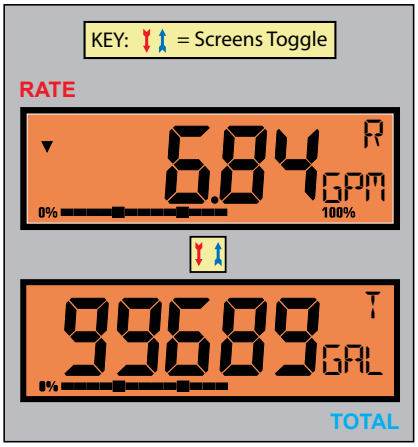
Everything comes standard with these meters. The competition may charge extra for loop-powered backlighting, open collector output and programmable exponent capability, but these and a host of other key features are standard on these indicators.

Install Just About Anywhere

Indoors, outdoors, bright sunlight, dimly lit plant, wet, dirty, hot or cold, these indicators go just about anywhere. Their shallow-depth case, FM Type 4X front, loop-powered backlighting, and wide operating temperature range are all standard features. And the PD689 with its FM Approval and CSA Certification can be installed in just about any hazardous location.

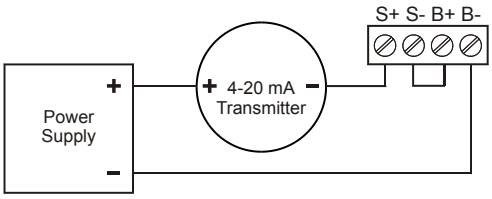
Alternating Rate/Total Display

Press Enter/ACK button to alternate between rate and total or program the totalizer so the display automatically changes between displaying rate and total every 10 seconds. This feature is particularly useful if the meters are mounted inside a NEMA 4X or an explosion-proof enclosure.

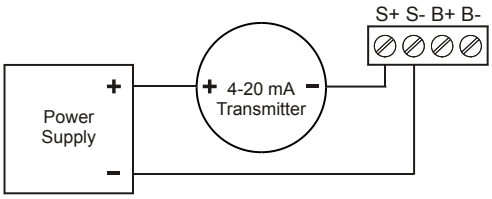


4-20 mA Input Connections

Wiring with Backlight



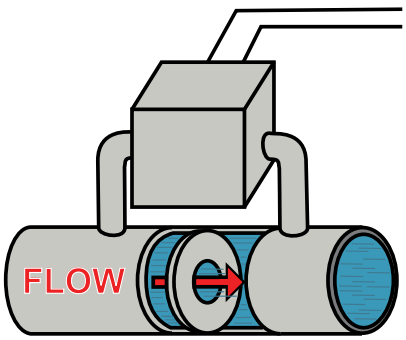
Wiring without Backlight



Square Root Function

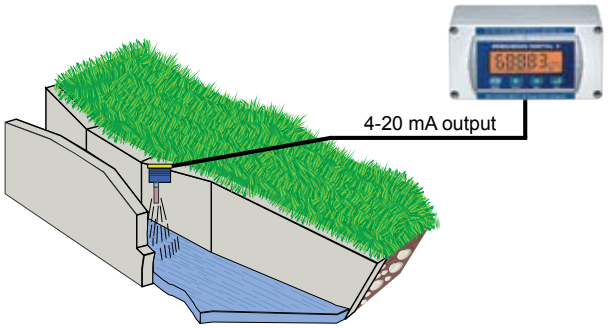
The square root extraction feature displays flow rate by extracting the square root from a differential pressure transmitter signal. The user selectable low-flow cutoff feature gives a reading of zero when the flow rate drops below a user selectable value.

- Displays Flow Rate
- User Selectable Low-Flow Cutoff
- Only 2 Calibration Points Required



Programmable Exponent

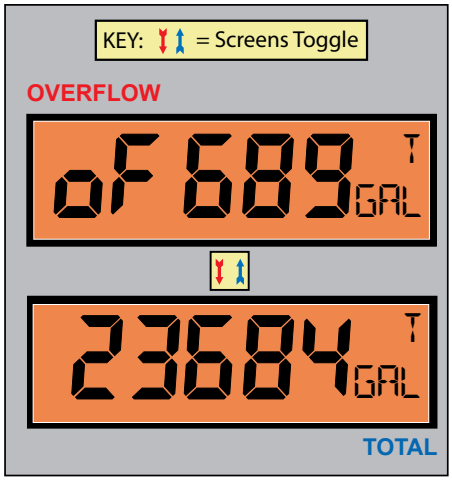
The programmable exponent function is used to linearize the level signal in open channel flow applications using weirs and flumes and display flow rate & total in engineering units.



Totalizer Conversion Factor

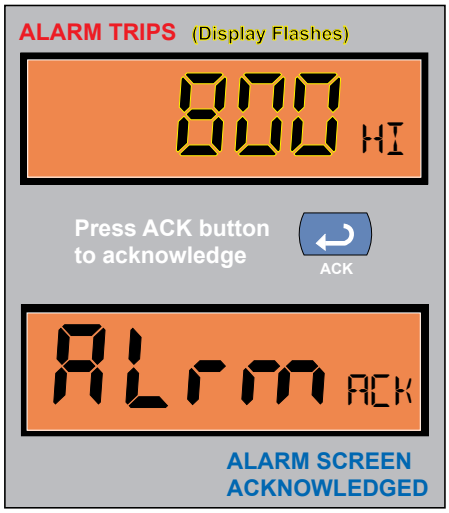
The totalizer conversion factor is a number which is multiplied by the rate to compute total. For example, if the rate display is gallons per hour and total is desired in liters, a factor of 3.7843 should be used. If the rate display is gallons per hour and total is desired in gallons, a factor of 1 should be used.

Total & Overflow Display



This feature allows the PD684 & PD689 to display total values up to eight digits. This sample shows a total of 68,923,684.

Alarm Condition



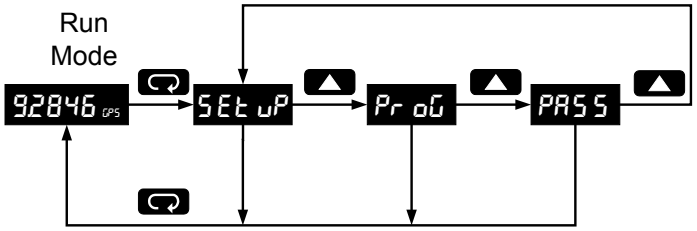
After an alarm has tripped simply press the ACK button for 3 seconds to acknowledge the alarm or wait for the alarm to reset automatically.

SETUP & PROGRAMMING

Easy Setup

Even with all the features packed into these meters, they're still easy to setup and get running. Everything is programmed from the front panel buttons with no pots or jumpers to deal with. In fact, these meters can be scaled without a signal source for even quicker setup.

Main Menu

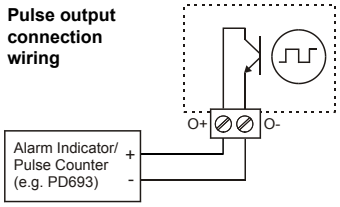


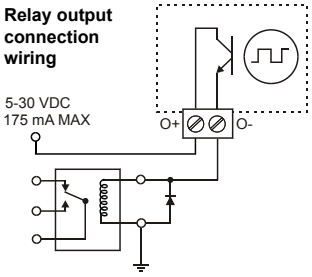
Advanced Features Menu

To simplify the setup process, functions not needed for most applications are located in the Advanced Features menu. Press and hold the Menu button for five seconds to access the advanced features of the meter.

Isolated Open Collector Output

The open collector output may be assigned as a pulse or alarm output. As a pulse output this feature will produce one pulse output per a given number of counts (user select). For example, these meters can be programmed to produce one pulse for every 500 gallons totalized. This output can be sent to a PLC or a counter. As an alarm output this feature allows high or low rate indication or total setpoint indication.



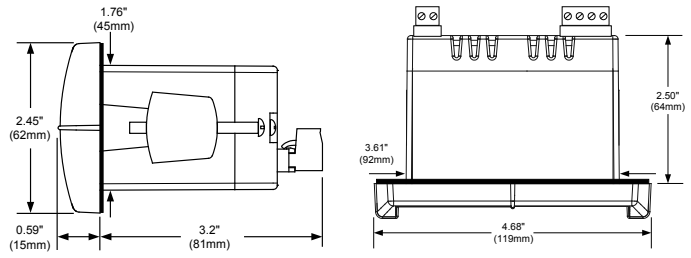


INSTALLATION

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

Mounting Dimensions

Units: Inch (mm)



Notes:

1. Panel cutout required: 3.622" x 1.772" (92 x 45)
2. Panel thickness: 0.040" - 0.250" (1.0 – 6.4)
3. Mounting brackets lock in place for easy mounting

MODEL PD684 & PD689 LOOP-POWERED RATE/TOTALIZERS

SPECIFICATIONS

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

General

Display: 5 digit LCD (-99999 to 99999), 0.60" (15.2 mm) high, 7-segment, automatic lead zero blanking.
Engineering Units: 0.25" (6.4 mm) high, 14-segment
Bargraph: 20-segment, 0-100% indication
Trend Arrows: Up and down trend indication
Backlight: Bright orange LED (intensity varies with signal)
Front Panel: FM Type 4X, IP65; panel gasket provided
Display Update Rate: 2.5/second
Overrange: Display flashes 99999
Underrange: Display flashes -99999
Programming Method: Four front panel buttons
Noise Filter: Programmable from 1 to 199
Recalibration: 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: Programmable password restricts modification of programmed settings.
Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Voltage Drop: 2.0 V max w/o backlight, 5.7 V max with backlight
Equivalent Resistance: 100 Ω @ 20 mA without backlight, 285 Ω @ 20 mA with backlight.
Normal Mode Rejection: 64 dB at 50/60 Hz
Operating Temperature Range: -20 to 65°C
Allowable Temperature Range: -40 to 65°C* (see note below)
Storage Temperature Range: -40 to 85°C
Relative Humidity: 0 to 90% non-condensing
Connections: Screw terminals accept 12 to 22 AWG wire
Enclosure: 1/8 DIN, high impact plastic, UL 94V-0, color: gray
Mounting: 1/8 DIN panel cutout required. Two panel mounting bracket assemblies provided.
Tightening Torque: 4.5 lb-in (0.5 Nm) Screw terminal connectors
Overall Dimensions: 4.68" x 2.45" x 3.79" (119 x 62 x 96 mm)
Weight: 5.7 oz (162 g)
Warranty: 3 years parts and labor
Extended Warranty: 1 or 2 years, refer to Price List for details

* Below -20°C the LCD becomes less readable. See application note AN-1005.

Input

Input Range: 4-20 mA
Accuracy: ±0.03% of span ±1 count, square root and programmable exponent: 10-100% FS.
Calibration: Scale without signal or calibrate with signal source
Calibration Range: User programmable over entire range of meter
Minimum Span: 0.40 mA between input 1 and input 2
Note: An Error message will appear if input 1 and input 2 signals are too close together.
Input Overload: Over current protection to 2 A maximum
Decimal Point: Up to 4 places (d.dddd, dd.ddd, ddd.dd, dddd.d, or ddddd)
Function: Linear, square root, or programmable exponent
Low-Flow Cutoff: -99999 to 99999 (-99999 disables cutoff function)
Temperature Drift: 50 PPM/°C from -40 to 65°C ambient

Disclaimer

Totalizer Features

Total Display: 0 to 99,999 main total display plus 0 to 999 total overflow for a combined 8 digit total of 99,999,999.
Alternating Display: Totalizer may be programmed to alternate between rate and total every 10 seconds.
Time Base: Seconds, minutes, hours, or days
Totalizer Conversion Factor: 0.0001 to 99999
Totalizer: Calculates total based on rate, time base of second, minute, hour, or day, and field programmable multiplier; stored in non-volatile memory upon power loss.
Totalizer Rollover: Total rolls over when total exceeds 99,999,999.
Totalizer Reset: Manual reset or automatic with time delay, or disabled for non-resettable total applications.

Open Collector Output

Rating: Isolated open collector, 30 VDC @ 175 mA maximum
Alarm Output: Assign to rate or total, high or low rate alarm.
Deadband: 0-100% FS, user selectable
Acknowledge: ACK button resets output and screen indication.
Automatic Reset: Alarm resets automatically when signal reaches the reset point.
Pulse Output: K-Factor programmable from 0.0001 to 99999.
Programmable frequency: 2, 4, 8, 16, 32, 64, 128 Hz.
Minimum pulse width: 3.9 ms @ 128 Hz.
Maximum pulse width: 250 ms @ 2 Hz.

PD689 Approvals for Hazardous Locations

FM Approved & CSA Certified as intrinsically safe with entity for use in Class I, Div 1, Groups ABCD; Class II, Div 1, Groups EFG; Class III, Div 1; Class I, Zone 0, Group IIC; T-code = T4.
Non-incendive: Suitable for use in Class I, Div 2, Groups ABCD; Class II, Div 2, Groups FG; Class III, Div 2.
Entity Parameters: U_i: 30 V; I_i: 175 mA; C_i: 0; L_i: 0; P_i: 1.0 W

Note: Installation must be performed in accordance with Control Drawing LIM688-2

ORDERING INFORMATION

Loop Leader® • PD684/PD689		
Model	**Description**	
PD684-0K1	Loop Leader® PRT	Rate/Totalizer for Safe Area
PD689-0K1	Loop Leader® PTH	Rate/Totalizer FM & CSA

Accessories			
Model	**Meters**	**Description**	**Mounting**
PDA24XX	1 - 2*	Plastic NEMA 4X	Inside Cover
PDA26XX	1 - 6*	Stainless Steel NEMA 4X	Through Door
PDA27XX	1 - 6*	Steel NEMA 4X	Through Door
PDA2801	1	Low-Cost NEMA 4X	Through Cover

Note: XX = the last two digits of the model number.
* Go to www.predig.com to find individual model numbers

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