

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

 **Loop Leader**<sup>®</sup>  
Series



**Model PD684 General Purpose**



**Model PD689 Hazardous Area**



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

PRECISION DIGITAL CORPORATION

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Actual Size

## 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

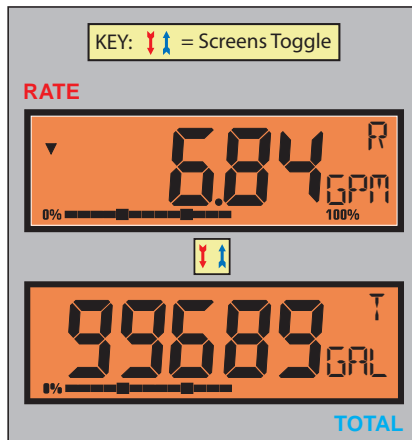
Everything comes standard with these meters. The competition may charge extra for loop-powered backlighting, open collector output and programmable exponent capability, but these and a host of other key features are standard on these indicators.

### 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 and ATEX Certifications can be installed in just about any hazardous location.

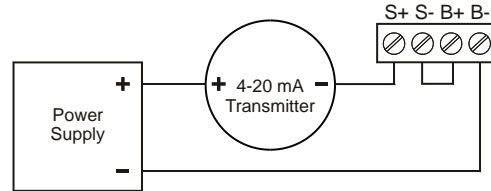
### Alternating Rate/Total Display

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.

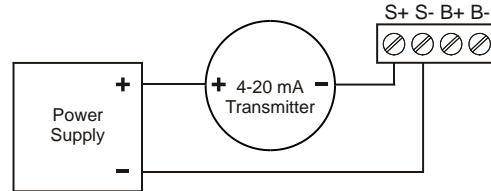


## 4-20 mA Input Connections

Wiring with Backlight



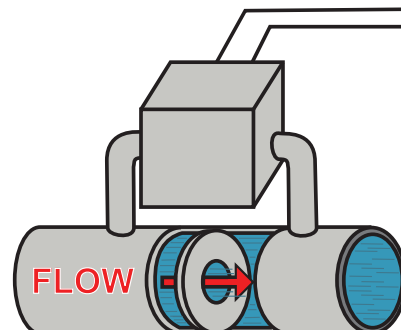
Wiring without Backlight



## Square Root Function

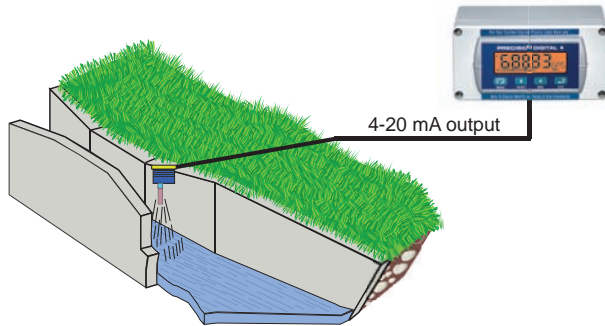
The square root extraction feature displays flow rate by extracting the square root from a differential pressure transmitter signal. The user selectable low-flow cutoff feature gives a reading of zero when the flow rate drops below a user selectable value.

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



### Programmable Exponent

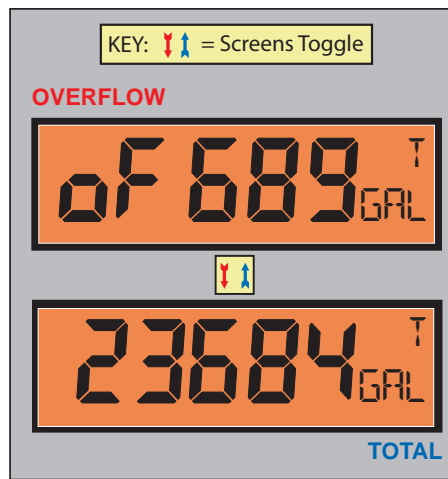
The programmable exponent function is used to linearize the level signal in open channel flow applications using weirs and flumes and display flow rate & total in engineering units.



### Totalizer Conversion Factor

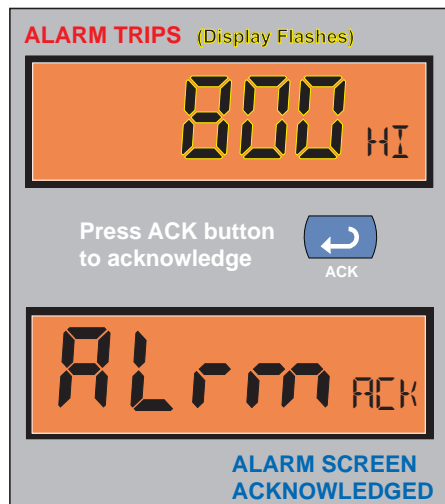
The totalizer conversion factor is a number which is multiplied by the rate to compute total. For example, if the rate display is gallons per hour and total is desired in liters, a factor of 3.7843 should be used. If the rate display is gallons per hour and total is desired in gallons, a factor of 1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



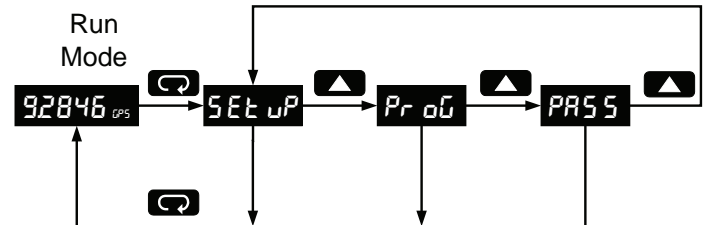
After an alarm has tripped simply press the ACK button for 3 seconds to acknowledge the alarm or wait for the alarm to reset automatically.

## 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

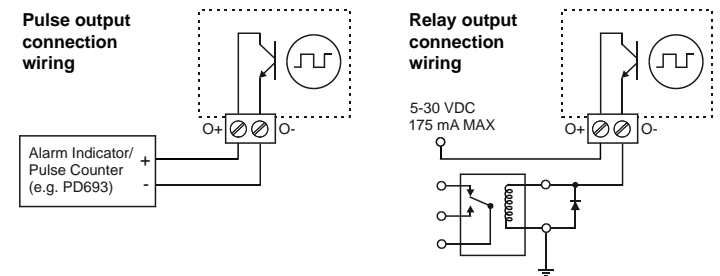


### Advanced Features Menu

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

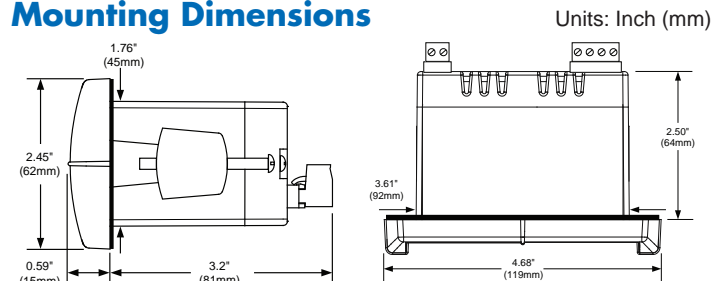
The open collector output may be assigned as a pulse or alarm output. As a pulse output this feature will produce one pulse output per a given number of counts (user select). For example, these meters can be programmed to produce one pulse for every 500 gallons totalized. This output can be sent to a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



#### 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

**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

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**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:** 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
- ATEX Certified:** II 1G, Ex ia IIC T4, IP65, Ta = -40°C to 65°C

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

**ORDERING INFORMATION**

Loop Leader® • PD684/PD689	
Model	Description
PD684-0K1	General Purpose
PD689-0K1	FM Approved, CSA & ATEX Certified

Accessories			
Model	Meters	Description	Mounting
PDA2801	1	Low-Cost NEMA 4X	Through Cover

For more enclosure selections go to [www.predig.com/esu](http://www.predig.com/esu)

**Your Local Distributor is:**

LDS689\_H 07/10