

# RATE/TOTALIZER/BATCH CONTROLLERS

## MODEL PD692 ANALOG INPUT



### Analog Inputs

- 4-20 mA, 0-5 V, 0-10 V inputs
- 24 V transmitter power supply standard
- 11-point linearization
- Square root function
- Programmable exponent for weirs & flumes
- Pump alternation function
- Input overload protection

### Common Features

- 4½ digit + extra zero display for rate
- 6 digit display for total
- Alternating rate/total display
- Any relay for rate or total
- Time base in seconds, minutes, hours, or days
- Quick points for easy batch setting

## MODEL PD693 FREQUENCY/PULSE INPUT



### Pulse Inputs

- Pulse, open collector, NPN, PNP, TTL, switch contact, square wave inputs
- 12 VDC @ 50 mA or 24 VDC @ 20 mA excitation
- Gate function for rate display of slow pulse rates
- K-Factor, internal or external calibration
- 4-20 mA output option converts the pulse input to an isolated 4-20 mA output

## GENERAL FEATURES

The PD692 & PD693 are six digit rate/totalizer/batch controllers used to display flow rate and total, control automatic or manual batching, and provide various higher level functions including programmable root extraction and pump alternation control. The PD692 is an analog input device accepting 4-20 mA, 1-5 V, 0-5 V, and 0-10 V field selectable inputs. The PD693 accepts pulse, square wave, and 0-5 V or 0-12 V @ 30 kHz inputs.

## Single Button Scaling

Single button scaling means that these meters can be completely programmed using only one button. Simply press the **ENTER** button to initiate the automatic menu scan. When the desired menu appears press the **ENTER** button again. Once in a menu, press the **ENTER** button when the display reads the desired value. To exit setup & programming press the **ACK** (Acknowledge) button while displaying any of the main menus. It's that simple!

## Stand Alone Scaling

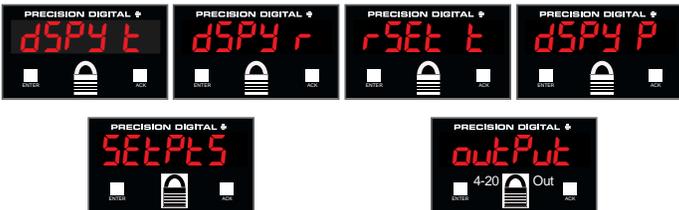
The PD692 & PD693 may be scaled without a signal source or calibrated with a signal source.



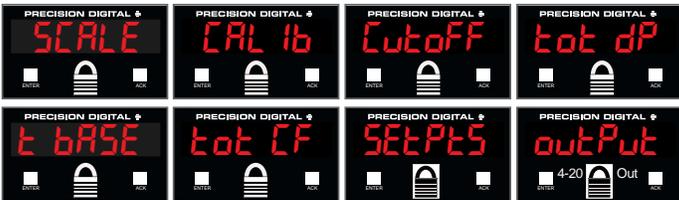
## Lockout and Menu-Title Disabling

The ability to modify programming values can be restricted by installing a lockout jumper on terminals at the rear of the instrument. In addition, certain menu titles can be programmed not to appear during the menu scroll with the display menu.

Menu titles that can be excluded with **dSPly** menu functions



Functions that can be locked out with the lockout jumper



Menu Doesn't Appear When Locked Out	Menu Title Always Appears But Menu Values Can Be Restricted	When 4-20 Out Option Installed Menu Title Always Appears But Menu Values Can Be Restricted
		4-20  Out

## Four Visual Alarms Standard

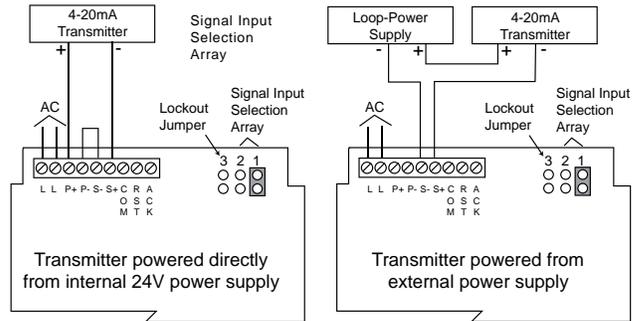
The PD692 & PD693 have four visual independent alarm points. Each is easily programmed for high or low set point and 100% deadband. Front panel LEDs indicate alarm status and assist in set point/reset point programming.

## Simplify Loops with

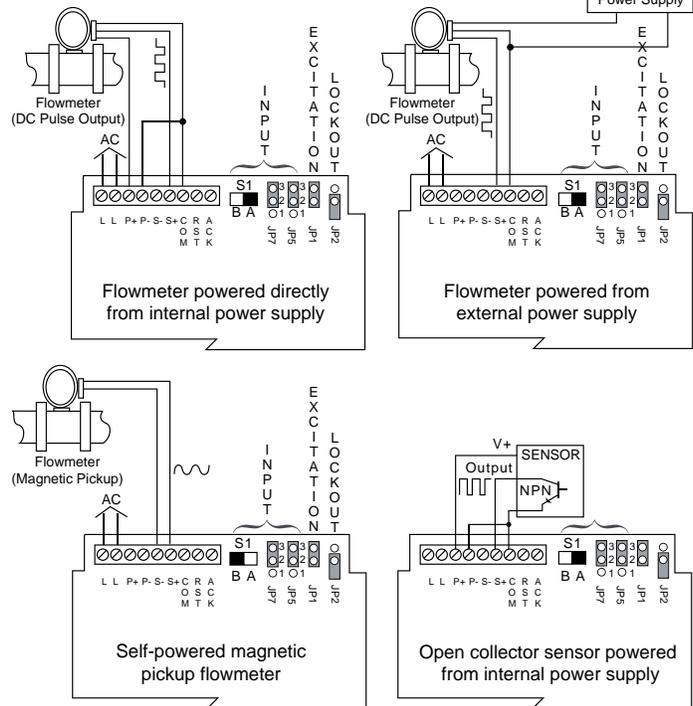
## Internal Power Supply

The PD692 internal power supply provides 24 VDC at 20 mA to drive either the 4-20 mA input or output loop. The PD693 provides 12 VDC at 50 mA or 24 VDC at 20 mA to power either the flowmeter input or the 4-20 mA output.

### PD692 Loop Connections



### PD693 Flowmeter Connections



## FLOW FEATURES

The PD692 & PD693 may be used to display flow rate and total from a wide variety of flowmeters. For flow rate applications, these meters feature programmable time base of seconds, minutes, hours, and days, a 4 1/2 digit plus extra zero display, and low-flow cutoff capability. For total applications, these meters feature a full six-digit display, a programmable totalizer conversion factor, and the ability to automatically or manually toggle back and forth between rate and total display. New features include Programmable Root function for weirs and flumes for the PD692 and gate function and contact de-bounce filter functions for the PD693. In addition, these meters' new full diagnostic menu simplifies programming troubleshooting.

**OPTIONS**

The PD692 & PD693 can be equipped with 2 or 4 SPDT relays and 4-20 mA output options. Any one of the relays can be programmed to function on the rate or the total. The 4-20 mA output option provides signal isolation and is very useful for converting the pulse output from a flowmeter into a 4-20 mA signal.

**Rate Relays**

Rate relays are field programmable as latching or non-latching and 0-100% adjustable deadband. They can be used as high or low alarms or for simple on-off control, such as sump-pump control. Pairs of rate relays can also be programmed to alternate making these meters ideal for pump control applications.



**Total Relays**

Total relays can be programmed for manual (E for External Reset) or automatic (! for Internal Reset) batch control. To simplify and speed up batch-size changes, total relays can be programmed so the first preset always trips at a user-defined offset value before the main preset trips. In addition, the Priority Batch Programming feature allows the user to program the batch presets without having to go through the entire menu. Simply hold the ENTER button for three seconds and the meter jumps right to batch presets.



**4-20 mA Output Option**

The PD692 & PD693 can be equipped with an isolated 4-20 mA output signal option that can be programmed to produce a 4-20 mA output signal for virtually any input. The 4-20 mA output signal can be powered either by the internal or an external power supply. If the internal power supply is used, it is not available to power the transmitter input. The 4-20 mA output provides 500 VDC or peak AC, input-to-output or input/output-to-power isolation.

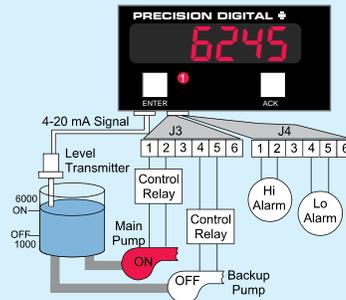
**Option Card Pin-Outs**

Pin:	Function:
J1 { 1	Transmitter +
2	Transmitter -
J2 { 1	Relay #1 Common
2	Relay #1 NC
3	Relay #1 NO
4	Relay #2 Common
5	Relay #2 NC
6	Relay #2 NO
J3 { 1	Relay #3 Common
2	Relay #3 NC
3	Relay #3 NO
4	Relay #4 Common
5	Relay #4 NC
6	Relay #4 NO

Groupings: PD175 (pins 1, 2); PD176 (pins 1, 2, 3); PD174 (pins 4, 5, 6); PD178 (pins 1, 2, 3, 4, 5, 6); PD177 (pins 1, 2, 3, 4, 5, 6).

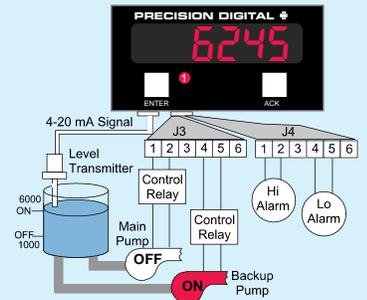
**PUMP ALTERNATION**

1



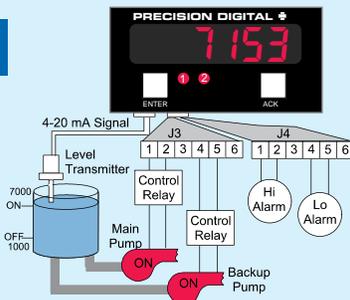
Relay #1 turns the main pump on at 6000 gallons and turns it off at 1000 gallons.

2



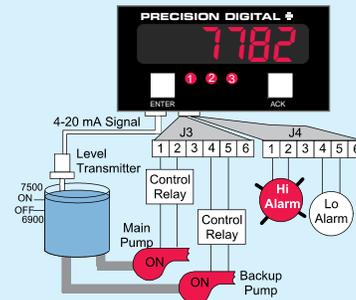
With the Pump Alternation feature activated, the next time the level reaches 6000 gallons, relay #2 transfers and starts the backup pump.

3



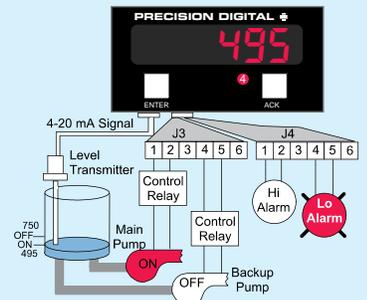
If backup pump is not able to keep up, and the level reaches 7000 gallons, relay #1 transfers and starts the main pump as well

4



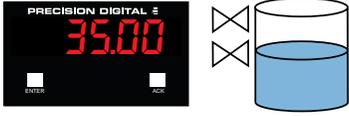
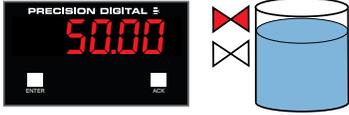
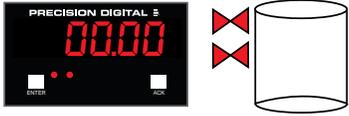
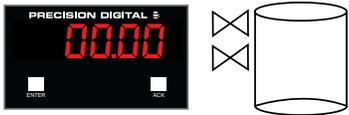
Relay #3 trips the High Level Alarm at 7500 gallons and resets at 6900 gallons.

5



Relay #4 trips the Low Level Alarm at 495 gallons and resets at 750 gallons.

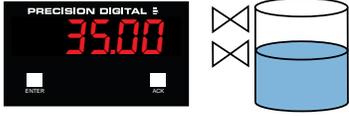
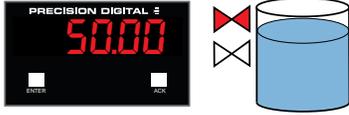
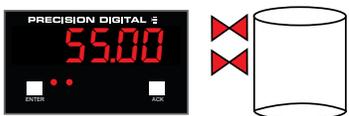
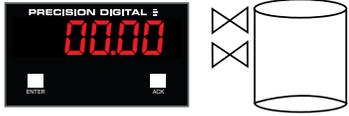
**AUTOMATIC BATCH CONTROL OPERATION**

The valve KEY Legend is as shown:	<p>KEY</p>  = VALVE CLOSED  = VALVE OPEN
Both valves are open to fill the barrel. Meter displays barrel contents.	
Full-flow valve #1 is closed and restricted-flow valve #2 “dribbles” in the remaining 5 gallons.	
When the total reaches 55.00, relay 2 trips and closes the restricted-flow valve #2. This automatically causes the total to reset to zero	
The full barrel is removed and a new barrel is inserted. The valves are still closed, and the two relays are still in the tripped condition.	
After the programmed delay has elapsed, the two relays will reset and the two valves will open.	
The new barrel will now begin to fill	

Notes:

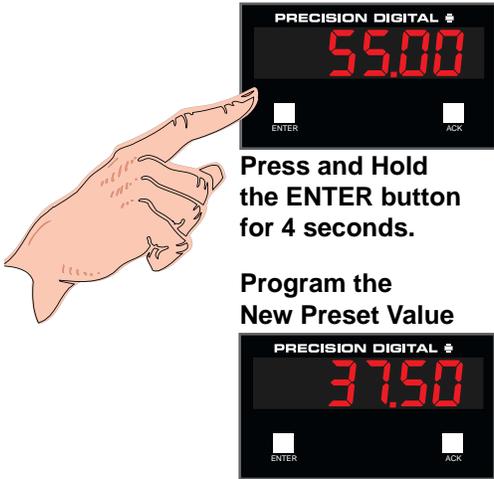
1. The top valve is the full-flow valve
2. The bottom valve is the restricted-flow valve

**MANUAL BATCH CONTROL OPERATION**

The valve and External Switch KEY Legend is as shown:	<p>KEY</p>  = VALVE CLOSED  = VALVE OPEN  = External Reset Switch  = External Reset Switch Activated
Both valves are open to fill the barrel. Meter displays barrel contents.	
Full-flow valve #1 is closed and restricted-flow valve #2 “dribbles” in the remaining 5 gallons.	
When the total reaches 55.00, relay 2 trips and closes the restricted-flow valve #2. Display freezes on 55.00 and relays 1 and 2 will not reset until external switch is pushed	
Both valves are still closed and a new barrel is positioned. Meter displays previous barrel’s contents until external reset button is pushed	
Operator presses reset switch to reset total. Total goes to zero. Both relays reset causing both valves to open and begin filling the new barrel.	
Both valves are open to fill the barrel. Meter displays barrel contents.	

## PRIORITY BATCH PROGRAMMING

This feature allows the user to quickly change preset values without going into the main menu. This is accomplished by simply pressing and holding the ENTER button for more than three seconds.

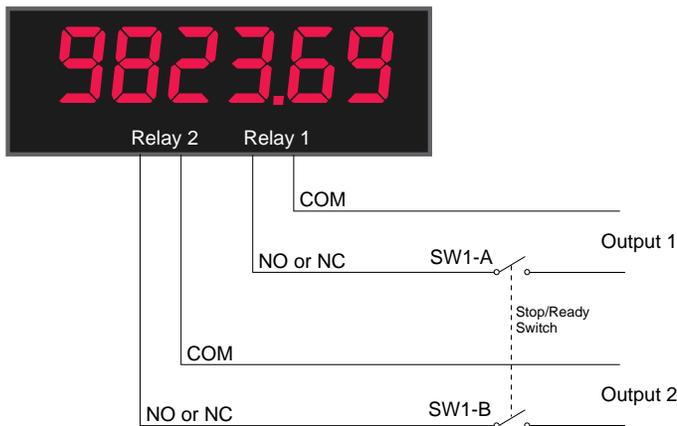


## APPLICATIONS

### Batch Control with Varying Batch Sizes

To simplify batch control applications with varying batch sizes, use one or more switches to control the relay outputs. The switch allows the operator to disable the process when changing presets in the meter and then enable the process after all the changes have been made and the process is ready to resume. The switch serves as a “Stop/Ready” control.

See application note AN-0001 at [www.predig.com](http://www.predig.com).



## OPTIONAL FIELD ENCLOSURES

The PD692 & PD693 can be mounted in a variety of different optional field enclosures. Enclosures are available in plastic, steel, stainless steel, or cast aluminum depending on the process environment.

### NEMA 4X



**PDA2600 Series  
Stainless Steel  
Enclosures**



**PDA2400 Series  
Plastic Enclosures  
with Clear Cover**



**PDA2700 Series  
Painted Steel  
Enclosures for  
4 to 6 Meters**

### Explosion-Proof

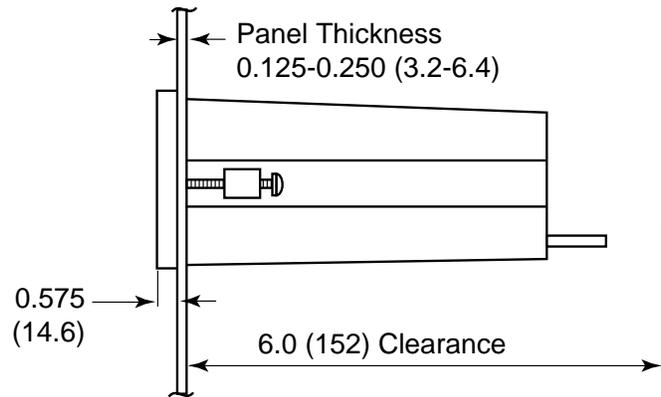
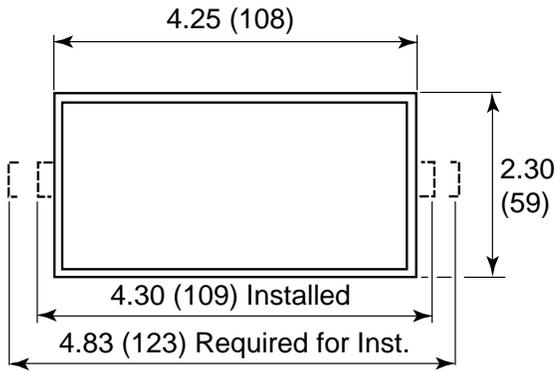


**PDA2444  
Explosion-Proof  
Enclosure for  
1 Meter**

**or**  
**PDA2446  
Explosion-Proof  
Enclosure for  
2 Meters**

## INSTALLATION

### Dimensions



## ORDERING INFORMATION

### PD692 Analog Input

#### 115 VAC Models

115 VAC Model	Options Installed	Option Card**
PD692-3-N*	None	
PD692-3-14*	2 Relays	PD174
PD692-3-15*	4-20 mA Output	PD175
PD692-3-16	2 Relays + 4-20 mA Output	PD176
PD692-3-17	4 Relays	PD177
PD692-3-18	4 Relays + 4-20 mA Output	PD178

#### 230 VAC Models

230 VAC Model	Options Installed	Option Card**
PD692-4-N	None	
PD692-4-14	2 Relays	PD174
PD692-4-15	4-20 mA Output	PD175
PD692-4-16	2 Relays + 4-20 mA Output	PD176
PD692-4-17	4 Relays	PD177
PD692-4-18	4 Relays + 4-20 mA Output	PD178

\*Quick Shipment Program product, shipped within 2 working days.

\*\*Part numbers for Option Cards when purchased separately.  
Listed models include the corresponding described option.

### PD693 Pulse Input

#### 115 VAC Models

115 VAC Model	Options Installed	Option Card**
PD693-3-N*	None	
PD693-3-14*	2 Relays	PD174
PD693-3-15*	4-20 mA Output	PD175
PD693-3-16	2 Relays + 4-20 mA Output	PD176
PD693-3-17	4 Relays	PD177
PD693-3-18	4 Relays + 4-20 mA Output	PD178

#### 230 VAC Models

230 VAC Model	Options Installed	Option Card**
PD693-4-N	None	
PD693-4-14	2 Relays	PD174
PD693-4-15	4-20 mA Output	PD175
PD693-4-16	2 Relays + 4-20 mA Output	PD176
PD693-4-17	4 Relays	PD177
PD693-4-18	4 Relays + 4-20 mA Output	PD178

#### 24 VDC Models

24 VDC Model	Options Installed	Option Card**
PD693-2-N	None	
PD693-2-14	2 Relays	PD174
PD693-2-15	4-20 mA Output	PD175
PD693-2-16	2 Relays + 4-20 mA Output	PD176
PD693-2-17	4 Relays	PD177
PD693-2-18	4 Relays + 4-20 mA Output	PD178

\*Quick Shipment Program product, shipped within 2 working days.

\*\*Part numbers for Option Cards when purchased separately.  
Listed models include the corresponding described option.

## ORDERING INFORMATION

### Enclosures

#### NEMA 4X

Model	No. of Meters	Description
PDA2407	1	Plastic with clear plastic cover
PDA2411	2	Plastic with clear plastic cover
PDA2412	3	Plastic with clear plastic cover
PDA2415	4	Plastic with clear plastic cover
PDA2504	4	Plastic with through door mounting
PDA2505	5	Plastic with through door mounting
PDA2506	6	Plastic with through door mounting
PDA2507	7	Plastic with through door mounting
PDA2508	8	Plastic with through door mounting
PDA2509	9	Plastic with through door mounting
PDA2510	10	Plastic with through door mounting
PDA2512	2	Plastic with through door mounting
PDA2604	4	Stainless steel with through door mounting
PDA2605	5	Stainless steel with through door mounting
PDA2606	6	Stainless steel with through door mounting
PDA2704	4	Painted steel with through door mounting
PDA2705	5	Painted steel with through door mounting
PDA2706	6	Painted steel with through door mounting

### Explosion-Proof

Model	No. of Meters	Description
PDA2444	1	Cast Aluminum, UL & C-UL Classified
PDA2446	2	Cast Aluminum, UL & C-UL Classified

### Explosion-Proof Control Stations

Model	Description
PDA2451-E	1 Switch - ENTER
PDA2451-R	1 Switch - RESET
PDA2451-A	1 Switch - ACK
PDA2452-ER	2 Switch - ENTER & RESET
PDA2452-EA	2 Switch - ENTER & ACK
PDA2453-EAR	3 Switch - ENTER, RESET, & ACK

### 2" Pipe Mounting Kit

Model	Description
PDA6545	For PDA2407, PDA2444, & PDA2446

### Services

#### Calibration

Model	Description
PDN-CAL	2-Point Calibration
PDN-CAL2	Multi-Point Calibration
PDN-CERTCAL	Certificate of Calibration
PDN-CERTCAL2	Certificate of Calibration with Data
PDN-LTCAL	Lifetime Annual Recertification (shipped back same day)
PDN-LTCAL2	Lifetime Annual Recertification (shipped back next day)
PDN-LTCAL5	Lifetime Annual Recertification (shipped back within 5 days)

#### Certificate of Conformance

Model	Certificate for:
PDN-CERTCON	PD692 & PD693

#### Setup Services

Model	Description
PDN-CSETUP	Custom Setup
PDN-ONEDAYRTN	One-Day Turnaround Service

#### Extended Warranty Services

Model	Extended Warranty Term
PDN-EXTWRNTY1-0	1 Year with List Price of \$0-\$299
PDN-EXTWRNTY1-1	1 Year with List Price of \$300-\$599
PDN-EXTWRNTY2-0	2 Year with List Price of \$0-\$299
PDN-EXTWRNTY2-1	2 Year with List Price of \$300-\$599

#### Same Day Shipping

Model	Extended Warranty Term
PDN-SHEXP1	For In-Stock Product Ordered After 3:00 pm (EST)
PDN-SHEXP2	Ordered After 3:45 pm (EST)

**SPECIFICATIONS**

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

**General**

- Display:** 6 digits, 0.56" (14.2 mm) red LED  
Rate: -19,999(0) to 29,999(0) with selectable extra zero  
Total: 0 to 999,999
- Decimal Point:** Process/rate: 2.9999, 29.999, 299.99, 2999.9, or extra zero may be turned on 299990. Total: 9.99999, 99.9999, 999.999, 9999.99, 99999.9, 999999.
- Multi-Point Linearization:** 2 to 11 points
- Front Panel:** NEMA 4X, IP65; panel gasket provided
- Max Display (Peak):** Captures the peak process/rate and displays it via the front panel **ENTER** button (*d5P4 P*)
- Max Display Indication:** Front panel flashing R LED
- Non-Volatile Memory:** Settings stored for a minimum of 10 years.
- Power Options:** 115 VAC ±10%, 230 VAC ±10%, 50/60 Hz, 10 VA; or 22-28 VDC, 6 W maximum; option for PD693 only.
- Isolation:** AC powered: 1500 V; DC powered: 500 V
- Operating Temperature:** 0 to 60°C
- Storage Temperature:** -40 to 85°C
- Relative Humidity:** 0 to 90% non-condensing
- Enclosure:** 1/8 DIN, high impact plastic, UL 94V-0, color: black
- Weight:** 19.7 oz (559 g) (including options)
- Connections:** Removable screw terminals accept 12 to 22 AWG
- Alarm Points:** 4, any combination of high or low alarms
- Alarm Status Indication:** Front panel LED
- Alarm Deadband:** 0-100%, user selectable
- UL File Number:** E160849; 508 Industrial Control Equipment
- Warranty:** 2 years parts & labor
- Extended Warranty:** 1 or 2 years, refer to Price List for details.

**PD692 Analog Input**

- Inputs:** Field selectable: 4-20 mA, 0-20 mA, 0-5 V, 1-5 V, 0-10 V
- Linear Input Accuracy:** ±0.05% FS ±1 count
- Square Root Accuracy:** ±0.1% FS ±2 counts
- Programmable Exponent:** 1.0001 to 2.9999
- Calibration Range:** User programmable over entire range of meter
 

Input Range	Minimum Span
0-5 V	Input 1 & Input 2
0-10 V	0.16 V
4-20 mA	0.32 V
	1.60 mA
- Input Impedance:** Voltage ranges: greater than 300 kΩ;
- Current range:** 100-120 Ω, varies with resettable fuse impedance
- Input Overload:** Protected by automatically resettable fuse
- Lockout:** Jumper 3 restricts modification of programmed settings.
- Transmitter Supply:** Isolated 24 VDC ±5% @ 20 mA. Maximum loop resistance: 1200 Ω. Available for either input transmitter or 4-20 mA output option, but not both. Note: AC powered only.

**YOUR LOCAL DISTRIBUTOR IS:**

**PD693 Pulse Input**

- Inputs:** Field selectable: Pulse or square wave 0-5 V or 0-12 V @ 30 kHz; TTL; open collector 4.7 kΩ pull-up to 12 V @ 30 kHz; NPN or PNP transistor; switch contact 4.7 kΩ pull-up to 12 V @ 40 Hz.
- Accuracy:** ±0.1% FS
- Calibration:** May be calibrated using K-factor scaling, internal calibration or by applying an external calibration signal. Field programmable K-factor converts input pulses to rate in engineering units. May be programmed from 0.0001 to 999,999 pulses/unit.
- Input Impedance:** Pulse input: Greater than 300 kΩ @ 1 kHz. Open collector/switch input: 4.7 kΩ pull-up to 12 V.
- Sensor Power Supply:** Isolated, field selectable: 12 VDC @ 50 mA to power the sensor or 24 VDC @ 20 mA ±5% for output option. Note: AC powered only.
- Filter:** Programmable contact debounce filter
- Gate:** Low gate: 1 to 98 seconds; High gate: 2 to 99.9 seconds
- Lockout:** Jumper JP2 restricts modification of programmed settings.

**Rate/Totalizer/Batch Controller**

- Rate Display Indication:** LED labeled R on right illuminates when meter is displaying rate or process input
- Low-Flow Cutoff:** Any input below the low-flow cutoff value will result in a display of zero. May be set from 1 count to 100% FS, user selectable. To disable low-flow cutoff, program cutoff value to zero. Totalizer is based on rate display; inputs below the low-flow cutoff value will not affect the totalizer (low-flow cutoff is ignored in PD693 K-factor mode).
- Alternating Display:** Display may be programmed to alternate between rate and total every 10 seconds.
- Total Display:** 0 to 999,999
- Total Decimal Point:** May be set in any of the following positions: 9.99999, 99.9999, 999.999, 9999.99, or 99999.9, 999999. Total decimal point is independent of process/rate decimal point.
- Time Base:** Seconds, minutes, hours, or days (time base of days available on PD692 only).
- Total Conversion Factor:** Programmable from 0.00001 to 59999  
Totalizer: Calculates total based on rate and field programmable multiplier to display total in engineering units. Total is stored in non-volatile memory.
- Totalizer Rollover:** Totalizer rolls over when total exceeds 999,999. Relay status reflects the display value.
- Totalizer Presets:** Up to four, user selectable under Setup menu. Any set point can be assigned to total and may be programmed anywhere in the range of the meter.
- Preset Offset:** Relays assigned to total can be programmed to trip at any point below the next relay's preset value.
- Programmable Delay on Release:** If the meter is programmed to reset total to zero automatically when the highest preset is reached, then a delay will occur before the total relays reset. This delay can be programmed anywhere between 1 and 999 seconds.
- Priority Batch Programming:** This feature allows the user to quickly change preset values without going into the main menu by holding the **ENTER** button for more than 3 seconds.
- Total Reset:** Via front panel **ENTER** button, external contact closure, or automatically via user selectable preset value.
- Total Reset Lockout:** Meter may be programmed so total cannot be reset from the front panel.