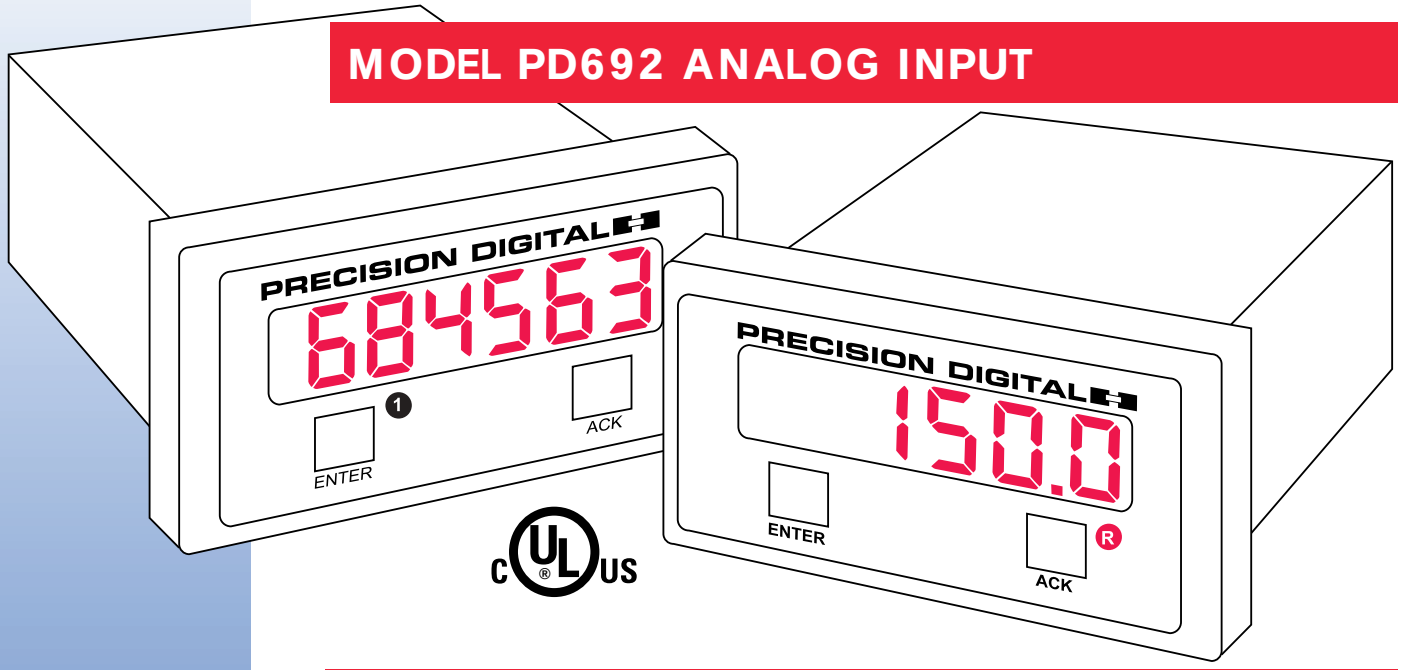
RATE/TOTALIZER/BATCH CONTROLLERS

MODEL PD692 ANALOG INPUT



MODEL PD693 FREQUENCY/PULSE INPUT

PD692 Analog Input & PD693 Frequency/Pulse Input

- Full six digit total display
- 4 1/2 digit + extra zero rate display
- Alternating rate/total display
- Calibration and programming lockout
- NEMA 4X, Type 4X front panel
- 11-point calibration for non-linear inputs
- 2 or 4 relays + 4-20 mA output options
- Any relay programmable for rate or total
- Latching and non-latching relays
- Time base in seconds, minutes, hours, & days
- Enhanced priority batch programming
- Totalizer reset via menu, external contact, or automatically
- Calibration bail-out with ACK button
- Easy access to full Diagnostic menu
- 115 or 230 VAC power
- 24 VDC power option available

PD692 Analog Input

- 4-20 mA, 1-5 V, 0-5 V, or 0-10 V Field Selectable Inputs
- Isolated 24 V transmitter supply on AC models
- Programmable Root function for weirs & flumes
- Automatic Square Root extraction
- Internal or External calibration
- Pump Alternation
- 4-20 mA output option

PD693 Frequency/Pulse Input

- Pulse, Open Collector, TTL, or Square Wave Field Selectable Inputs
- 12 VDC @ 50 mA or 24 VDC @ 20 mA field selectable power supply
- Gate function to display slow pulse rates
- Contact De-Bounce Filter for counting pulses generated by switch contacts
- K-Factor, Internal, or External calibration
- 4-20 mA output option converts the pulse input into an isolated 4-20 mA output

GENERAL FEATURES

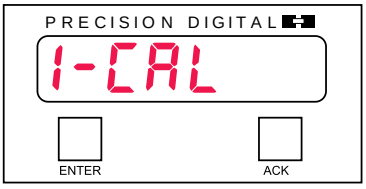
The PD692 & PD693 are six digit universal rate/totalizer/batch controllers used to display flow rate and total; control automatic or manual batching; and provide various higher level functions including programmable root extraction and pump alternation control. The PD692 is an analog input device accepting 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

The PD692 & PD693 are completely programmed using only one button. Press **ENTER** to start menu scanning; then select the menu; then your desired value. Programming ease is now enhanced in the PD692 & PD693 by a one touch calibration bail-out with the use of the ACK (Acknowledge) button.

Stand Alone Scaling

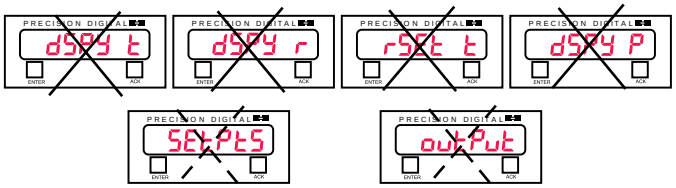
The PD692 & PD693 may be calibrated with or without applying a calibrated signal.



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.

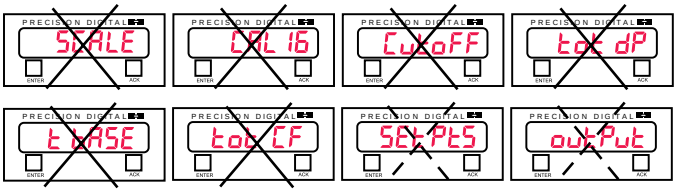
Menu titles that can be excluded with dSPLAY menu functions.



Menu title always appears. Ability to change values may or may not be restricted.

Menu title appears only if the 4-20 mA output option is installed.

Functions that can be locked out with the lockout jumper.



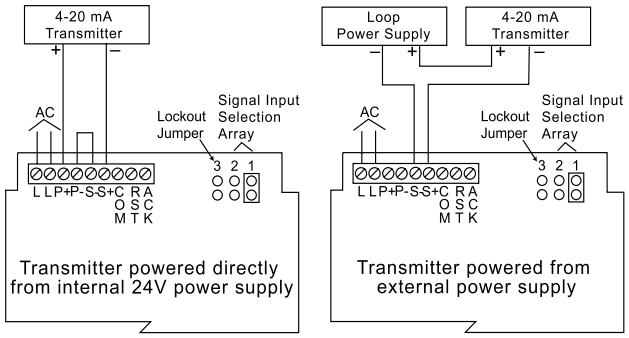
Four Visual Alarms Standard

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.

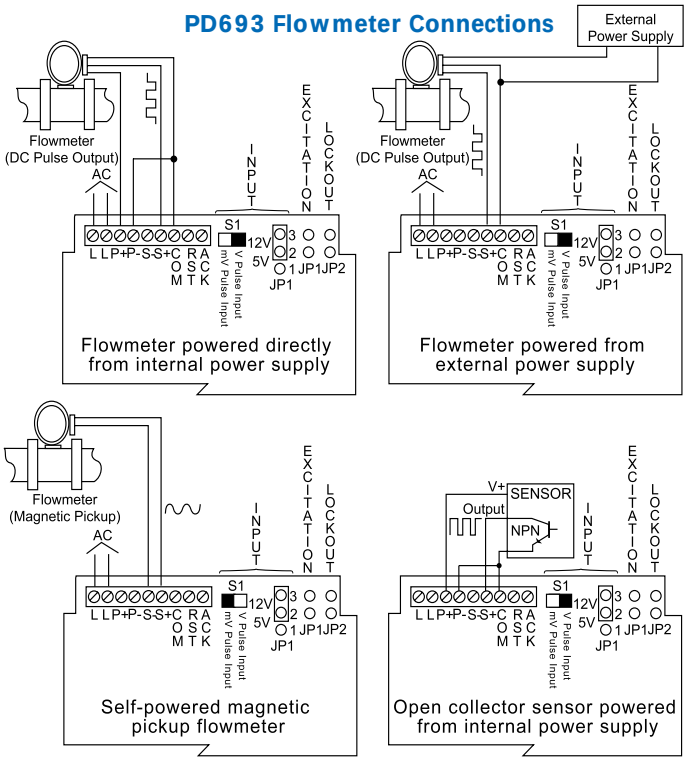
Simplify Loops with Internal Power Supply

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

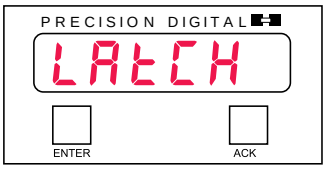
The PD692 & PD693 may be used to display flow rate and total from a wide variety of flowmeters. For flow rate applications, these meters feature programmable time base of seconds, minutes, hours, and days, a 4 1/2 digit plus extra zero display, and low-flow cutoff capability. For total applications, 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.

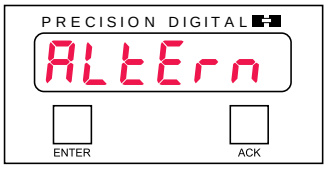
OPTIONS

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

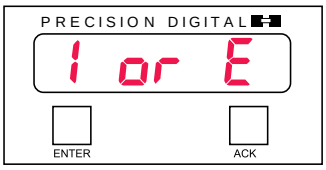
Rate relays are field programmable as latching or non-latching and 0-100% adjustable deadband. They can be used as high or low alarms or for simple on-off control, such as sump-pump control. Pairs of rate relays can also be programmed to alternate making these meters ideal for pump control applications.

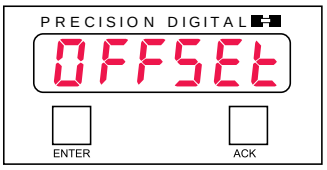




Total Relays

Total relays can be programmed for manual (E for External Reset) or automatic (I 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

Notes:

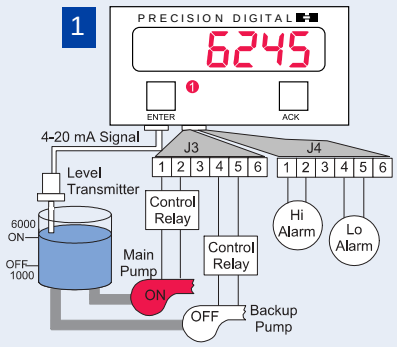
1. Alarm acknowledgement terminals (ACK and COM) are located on the meter main board.
2. In the alarm condition, the NC contact is connected to common in the fail safe mode.

	Pin:	Function:	
J1	1	Transmitter +	PD175
	2	Transmitter -	
J2	1	Relay #1 Common	PD176
	2	Relay #1 NC	
	3	Relay #1 NO	
	4	Relay #2 Common	PD174
	5	Relay #2 NC	
	6	Relay #2 NO	
J3	1	Relay #3 Common	PD177
	2	Relay #3 NC	
	3	Relay #3 NO	
	4	Relay #4 Common	
	5	Relay #4 NC	
	6	Relay #4 NO	

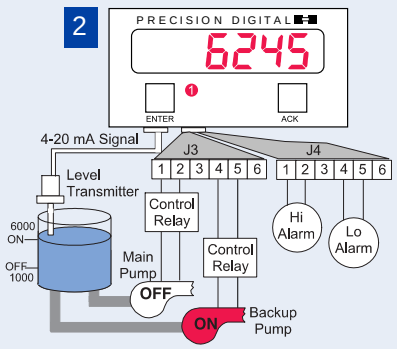
PD178

APPLICATIONS

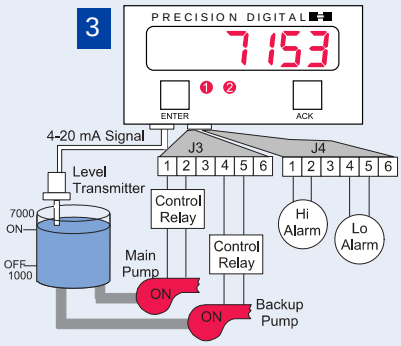
Pump Alternation



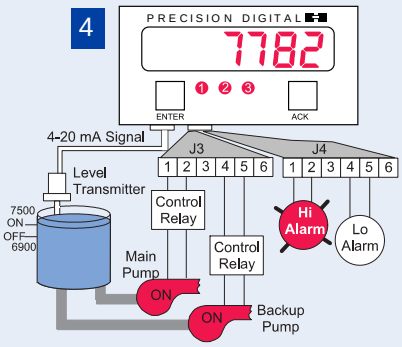
Relay #1 turns the main pump on at 6000 gallons and turns it off at 1000 gallons.



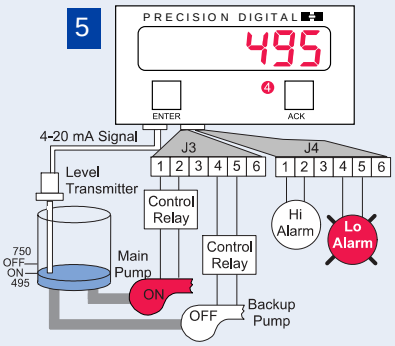
With the Pump Alternation feature activated, the next time the level reaches 6000 gallons, relay #2 transfers and starts the backup pump.



The backup pump is not able to keep up, so when the level reaches 7000 gallons, relay #1 transfers and starts the main pump.



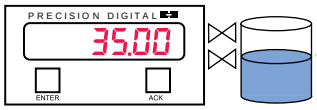
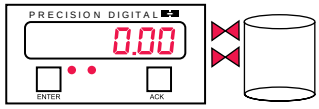
Relay #3 trips the High Level Alarm at 7500 gallons and resets at 6900 gallons.



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

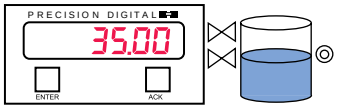
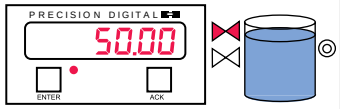
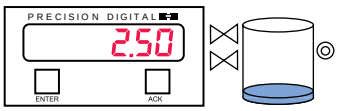
Automatic Batch Control Operation

KEY
= VALVE CLOSED
= VALVE OPEN

Both valves are open to fill the barrel. The top valve is the full flow-valve, the bottom valve the restricted-flow valve. The meter displays the barrel's content.	
Full-flow valve #1 is closed and restricted-flow valve #2 "dribbles" in the remaining 5 gallons.	
When the total reaches 55.00 gallons, relay 2 trips and the restricted-flow valve #2 closes. This automatically causes the total to reset to zero.	
The full barrel is removed and a new barrel inserted. The valves are still closed, 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 barrel will now begin to fill.	

Manual Batch Control Operation

KEY
= VALVE CLOSED
= VALVE OPEN
= External RESET Switch
= External RESET Switch Pressed

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 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.	

SPECIFICATIONS

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

General

INPUTS:
PD692 Field selectable:
4-20 mA, 0-20 mA, 0-5 V, 1-5 V, 0-10 V
PD693 Field Selectable:
Pulse or Square Wave 0-5 V or 0-12 V @ 30 kHz max.; TTL; Open Collector 4.7 KΩ pull-up to 12 V @ 30 kHz; Switch Contact 4.7 KΩ pull-up to 12 V @ 40 Hz.
DISPLAY: Six digit, 0.56″ (14.2 mm) high efficiency red or green seven segment LED. Rate: -19,999(0) to 29,999(0) with selectable extra zero Total: 0 to 999,999; automatic lead zero blanking
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 Rate and total decimal points are independent of each other.
CALIBRATION RANGE:
PD692:
4 mA (1 V) input may be set anywhere in range of the meter. 20 mA (5 V) may be set anywhere in range of the meter above or below 4 mA input.

An **Error** message will appear if input 1 signal and input 2 signal are too close together.

Input Range	Minimum Difference Between Input 1 & Input 2
0-5 V	0.16 V
0-10 V	0.32 V
4-20 mA	1.60 mA

PD693:
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:
PD692: Voltage ranges greater than 300 KΩ; Current ranges 100 Ω
PD693: Pulse Input greater than 300 KΩ @ 1 kHz
Open Collector/Switch Input 4.7 KΩ pull-up resistor to 12 V
LOOP POWER: (AC units only)
PD692: Isolated power supply, 24 VDC ± 5% @ 20 mA regulated
Maximum loop resistance is 1200 Ω
PD693: Field selectable, isolated: 12 VDC @ 50 mA for sensor supply or; 24 VDC @ 20 mA regulated ± 5%. Maximum loop resistance of 1200 Ω

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LINEAR INPUT ACCURACY:
PD692: ± 0.05% of calibrated span ±1 count
PD693: ± 0.1% of full scale
ROOT EXTRACTION ACCURACY: PD692 ±0.1% F.S. ± 2 counts
PROGRAMMABLE EXPONENT: PD692 1.0001 to 2.9999
11-POINT LINEARIZATION: PD692

Input Range	Minimum Span Between Inputs
4-20 mA	(1.6 mA / (Number of points -1))
0-5 V	(0.16 V / (Number of points -1))
0-10 V	(0.32 V / (Number of points -1))

e.g. Minimum span for an 11-point, 4-20 mA calibration is 0.16 mA between inputs.
PD693 Minimum span between inputs is 3 Hz
CONTACT DE-BOUNCE FILTER: PD693

Filter Setting	Speed Setting	Max Freq (Hz)
2	LO	950
4	LO	450
10	LO	200
25	LO	75
50	LO	40
N/A	HI	30,000

GATE FUNCTION: PD693 Slow Pulse rate

Low Gate	High Gate	Min Pulse Rate(p/s)	Min Freq(Hz)
1	3.1	1/3	0.33
1	10.1	1/10	0.01
1	30.1	1/30	0.0333
1	60.1	1/60	0.0167
1	90.1	1/90	0.0111
1	99.1	1/99	0.0101

ALARM POINTS: Four, any combination of high or low alarms
ALARM POINT DEADBAND: 0-100% of full scale, user selectable
ALARM STATUS INDICATION: Front panel LED
PEAK HOLD (DISPLAY PEAK): Captures the peak process/rate and displays it via the front panel **ENTER** button (dSPY P)
PEAK HOLD INDICATION: Front panel flashing R LED
LOCKOUT:
PD692: Jumper J3 restricts modification of calibration values
PD693: Jumper JP2 restricts modification of calibration values
NON-VOLATILE MEMORY: All programming values are stored in non-volatile memory for a minimum of ten years if power is lost.
POWER: AC power, 115 or 230 VAC ±10%, 50/60 Hz, 12 VA
DC power, 18-36 VDC, 6 watts maximum (PD693 DC version not UL Approved)
ISOLATION: AC powered 1500 VAC; DC powered 500 VDC
NORMAL MODE REJECTION: 64 dB at 50/60 Hz.
ENCLOSURE: 1/8 DIN, high impact plastic, UL 94V-0, color: black
FRONT PANEL: Type 4X, NEMA 4X, Panel gasket provided
ENVIRONMENTAL:
Operational Ambient Temperature Range: 0° to +60°C
Storage temperature range: -40° to +85°C
Relative humidity: 0 to 90% non-condensing
CONNECTIONS: Removable screw terminal blocks, accept 22 to 12 AWG wire
MOUNTING: 1/8 DIN panel cutout required. Two panel mounting brackets provided
OVERALL DIMENSIONS: 2.30 x 4.25 x 5.30 in. (58 x 108 x 135 mm)
WEIGHT: 16 oz (454 g); basic model, no options
WARRANTY: 1 year parts and labor
EXTENDED WARRANTY: Warranty may be extended an additional 12 months by returning the Product Registration Form within 2 months from date of purchase. See **www.predig.com for online registration.**
UL FILE NUMBER: E160849; 508 Industrial Control Equipment
PD693 DC powered units are not UL Listed

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% F.S., user selectable. To disable low-flow cutoff, program cutoff value to zero. Totalizer is based on rate display. So, inputs below the low-flow cutoff value will not affect the totalizer (Low-flow cutoff 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; automatic lead zero blanking
TOTAL DECIMAL POINT: May be set in any of the following positions: 9.99999, 99.9999, 999.999, 9999.99, or 99999.9 Total decimal point is independent of process/rate decimal point.
TOTALIZER: Calculates total based on rate and field programmable multiplier to display total in engineering units. Time base available in seconds, minutes, hours, or days. Time base must be selected according to time units in which rate is displayed.
TOTALIZER ROLLOVER: Totalizer rolls over when display exceeds 999,999. Relay status reflects display.
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

Relays

RATING: 2 or 4 SPDT (form C); rated 2 Amp @ 30 VDC or 2 Amp @ 250 VAC resistive load; 1/14 HP @ 125/250 VAC for inductive loads
ASSIGNED TO PROCESS/RATE OR TOTAL: Any relay may be assigned to process/rate or total.
ELECTRICAL NOISE SUPPRESSION: A suppressor (RC network) to prolong the life of the relays should be connected to each relay contact switching inductive loads. The suppressor provides a degree of protection against electrical noise caused by inductive loads. Recommended suppressor value, 0.01 μF/470 Ω, 250 VAC.
DEADBAND: 0-100% of full scale, user selectable
HIGH OR LOW ALARM: User may program any alarm for a high or low trip point
RELAY OPERATION: Latching or non-latching
FAIL-SAFE OPERATION: Relay coils are energized in non-alarm condition. In case of power failure, relays will go to alarm state. Fail-safe operation may be disabled, by removing jumper J2 located on the Options PCB.
AUTO INITIALIZATION: When power is applied to the meter, relays assigned to total will reflect the state of the accumulated total value in memory. Relays assigned to process/rate will reflect the state of the input to the meter.
RELAYS RESET: User select via JP3 jumper array and SEtuP menu
Total relays reset
1. When total is reset to zero, if set up for external total reset
2. After delay has elapsed, if set up for internal total reset
3. Manual any time, if set up for external total reset (via user supplied external contact closure at terminals AK and CM or front panel ACK button)

Manual reset resets all manually resettable relays.

Process/rate relays reset
1. Automatic reset only
2. Manual reset only, at any time
3. Automatic plus manual reset at any time
4. Manual reset only after alarm condition has been corrected

Automatic reset: Relays will automatically reset when the input passes the reset point.
Manual reset: It can be performed via user supplied external contact closure at terminals AK and CM or front panel ACK button. Manual reset resets all manually resettable relays.

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Isolated 4-20 mA Transmitter Output

CALIBRATION RANGE: The transmitter output can be calibrated so that a 4 mA output is produced for any process/rate measured by the meter. The 20 mA output may correspond to any process/rate that is at least 501 counts greater or smaller than the process/rate corresponding to 4 mA. (Ex. 4 mA = 0, 20 mA = 501) If the span between 4 and 20 mA is less than 501 counts, an error message will appear.

NO EQUIPMENT NEEDED: The 4-20 mA output from the meter is calibrated without the use of a calibrator.

OUTPUT LOOP POWER: 24 VDC ± 5% @ 20 mA, regulated Maximum loop resistance is 1200 Ω. Output loop is isolated from input loop power.

ACCURACY: ± 0.1% F.S., ± 0.004 mA

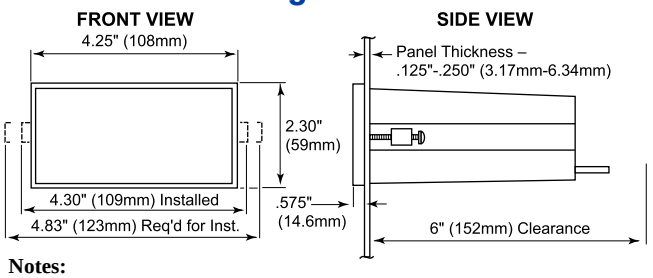
ISOLATION: 500 VDC or peak AC, input-to-output or input/output-to-power line

EXTERNAL LOOP POWER SUPPLY: 35 VDC max

OUTPUT LOOP RESISTANCE:

	Loop Resistance	
Power supply	**minimum**	**maximum**
24 VDC	10 Ω	600 Ω
35 VDC (external)	600 Ω	1000 Ω

Mounting Dimensions



Notes:
1. Panel cutout required: 1.772″ x 3.622″ (45 mm x 92 mm) 1/8 DIN
2. Panel thickness: 0.125″ - 0.250″ (3.17 mm - 6.34 mm)
3. Clearance: allow 6 inches (152 mm) behind the panel
4. Weight: 16 oz (454g)

ORDERING INFORMATION — Model PD692 Analog Input

115 VAC	230 VAC	24 VDC	Description	Option Card**
PD692-3-N*	**PD692-4-N**	**PD692-2-N**	No Options	
PD692-3-14*	**PD692-4-14**	**PD692-2-14**	2 Relays	**PD174**
PD692-3-15	**PD692-4-15**	**PD692-2-15**	4-20 mA Output	**PD175**
PD692-3-16	**PD692-4-16**	**PD692-2-16**	2 Relays + 4-20 mA Output	**PD176**
PD692-3-17	**PD692-4-17**	**PD692-2-17**	4 Relays	**PD177**
PD692-3-18	**PD692-4-18**	**PD692-2-18**	4 Relays + 4-20 mA Output	**PD178**

ORDERING INFORMATION — Model PD693 Frequency/Pulse Input

115 VAC	230 VAC	24 VDC	Description	Option Card**
PD693-3-N*	**PD693-4-N**	**PD693-2-N**	No Options	
PD693-3-14*	**PD693-4-14**	**PD693-2-14**	2 Relays	**PD174**
PD693-3-15	**PD693-4-15**	**PD693-2-15**	4-20 mA Output	**PD175**
PD693-3-16	**PD693-4-16**	**PD693-2-16**	2 Relays + 4-20 mA Output	**PD176**
PD693-3-17	**PD693-4-17**	**PD693-2-17**	4 Relays	**PD177**
PD693-3-18	**PD693-4-18**	**PD693-2-18**	4 Relays + 4-20 mA Output	**PD178**

Notes: *Quick Shipment Product, shipped within 2 working days. **Part numbers for Option Cards when purchased separately.
G may be added after second field in the part number to call out meters with a green display for an additional charge; example: PD692-3G-14.

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LDS692-3 Rev A 02/02

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