

# 4½ DIGIT STRAIN GAUGE METER

**MODEL PD691**



- 0-30 mV, 0-200 mV,  $\pm 15$  mV,  $\pm 100$  mV inputs
- 5, 10, or 24 VDC field selectable excitation
- NEMA 4X, IP65 front panel
- 0.56" (14.2 mm) red LED display
- 4½ digits + extra zero
- Max display or peak hold feature
- Capture or programmable tare function
- 115 VAC, 230 VAC, or 24 VDC power
- 2 or 4 relays + 4-20 mA output options

**GENERAL FEATURES**

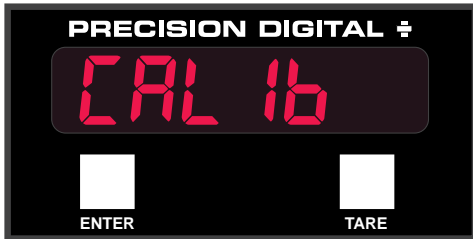
The PD691 is a high performance, industrial-grade 4½ digit Strain Gauge Meter. It accepts all the standard strain gauge and load cell signals: 0-30 mV, 0-200 mV, ± 15 mV and ± 100 mV and displays these signals in engineering units on a 4½ digit display. The display also includes an extra zero which may be used to handle numbers up to ±199,99(0).

**Single Button Scaling**

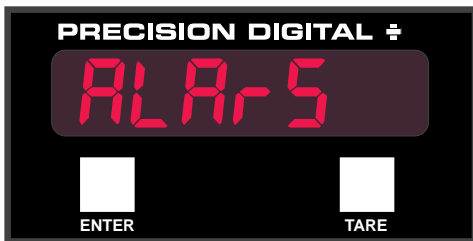
Single Button Scaling means the PD691 can be completely programmed using only one button. There are no complicated menu trees to navigate or button-pushing sequences to memorize. Simply press the **ENTER** button to initiate the automatic menu scan. When the desired routine appears press **ENTER** again. Once in a routine, press the **ENTER** button when the display reads the desired value. It's that simple!



**To Set Tare:**  
Press **ENTER** when the meter reads **TARE**.



**To Calibrate:**  
Press **ENTER** when the meter reads **CAL 16**.



**To Program Alarms:**  
Press **ENTER** when the meter reads **ALAR5**.

**NEMA 4X & IP65 Front Panel**

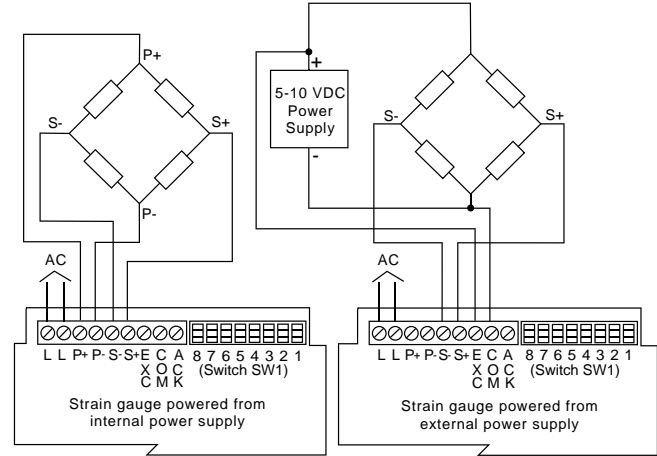
Wet, dirty and dusty environments don't bother the PD691 NEMA 4X & IP65 front panel so it can be installed in almost any panel in the plant. That means plant operators can have the important information right where they need it most, on the shop floor.

**Bright Steady Display for Big Numbers**

The PD691 4½ digit + extra zero display is great for displaying big numbers. Even when displaying large numbers, the PD691 display is steady and quick responding. The extra zero may be switched on to display ±19,999(0).

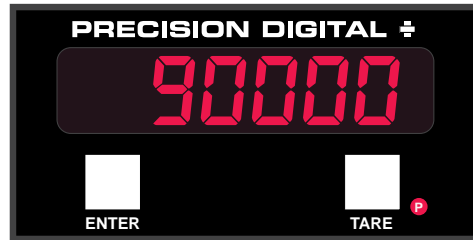
**Field Selectable Excitation Power Supply**

The internal power supply can provide either 5, 10, or 24 VDC power, (field select). Typical use for the 5 or 10 VDC supply is to power a strain gauge. The 24 VDC supply may be used to power the 4-20 mA output option. This standard feature saves time and money by simplifying wiring and eliminating the cost of an external power supply.



**Peak Hold**

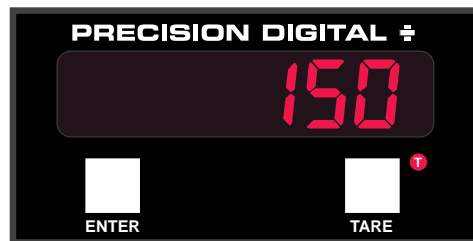
The peak-hold feature captures the highest displayed value and stores it in memory for later viewing. By entering the **dSPY P** routine the operator can display the peak value. a green LED labeled **P** will illuminate indicating the display is showing the peak value. Pressing the enter button again and entering the **rSEt P** routine will cause the last stored peak value to be erased from memory and a new peak value to be captured.



**PD691 Indicating a Peak Hold Value.**

**Tare**

The PD691 can be set for either Capture or Programmable Tare. Capture Tare sets a currently displayed reading to zero via the front panel Tare button. The operator may reset Capture Tare at any time in the field. Programmable Tare will automatically subtract a set tare value from the actual reading. A green LED labeled **T** will illuminate indicating the display is showing a tared value.



**PD691 Indicating a Tared Value.**

## Ratiometric Operation

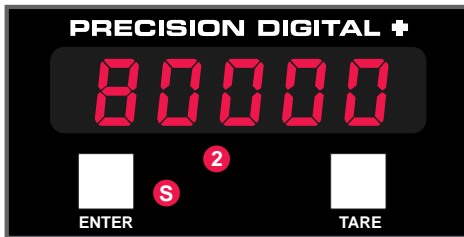
Ratiometric operation allows the meter to compensate for small fluctuations in the excitation power supply. A voltage drift of ±10% will not affect the display value of the PD691 when in Ratiometric mode. Selecting normal operation results in the unit not compensating for voltage fluctuations. The display value will shift as the voltage changes.

## 4 Visual Alarms Standard

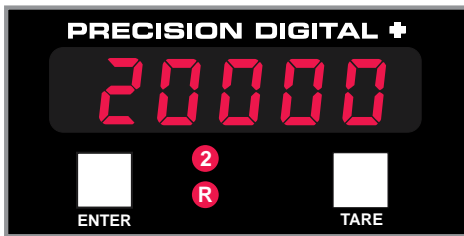
Every PD691 comes standard with 4 independent alarms. Each alarm is easily programmed for high or low set point and 0-100% deadband. Front panel alarm status LEDs assist in set/reset point programming and are perfect for *visual-indication-only* applications. Options are available for 2 and 4 relays.

## Alarm/Relay Programming

Pressing the **ENTER** button when the display reads **ALAr5** initiates a scan of the alarm set and reset points. First, the display flashes Alarm #1 Set Point and indicates this by illuminating the #1 LED and the “S” LED. This Set Point may be changed using the **ENTER** button. Next the display flashes Alarm #1 Reset Point and indicates this by illuminating the #1 LED and the “R” LED. This Reset Point may also be changed using the **ENTER** button. The remaining Set and Reset Points are programmed in a similar fashion.



PD691 Alarm #2  
Set Point is  
adjusted to 80000.



PD691 Alarm #2  
Reset Point is  
adjusted to 20000.

## Alarm Status Indication

When an alarm occurs, an LED will illuminate to indicate which alarm has tripped. This LED will stay illuminated until the meter returns to the non-alarm state.



PD691 indicating  
that Alarm #2 is  
in alarm condition.

## Linearization Feature

Displaying non-linear signals is a snap with the linearization feature. The user can input up to 11 calibration points and corresponding displays to handle a wide variety of non-linear signal applications.

## OPTIONS

The PD691 Strain Gauge Meter can be equipped with options for 2 or 4 relay contacts and isolated 4-20 mA transmitter output. These options may be combined in any configuration to satisfy a wide variety of applications. In fact, a fully loaded model PD691-3-18 includes linearization, 4 relays and isolated 4-20 mA transmitter output.

## Relay Options

The PD691 is available with 2 or 4 SPDT relays. The relays are rated 2 A @ 250 VAC, can be programmed for *automatic reset* or *automatic + manual reset*, and for 0-100% deadband.

## Isolated 4-20 mA Output Option

The PD691 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 for the 4-20 mA output, it is not available to power a strain gauge. The 4-20 mA output provides 500 VDC or peak AC, input-to-output or input/output-to-power isolation.

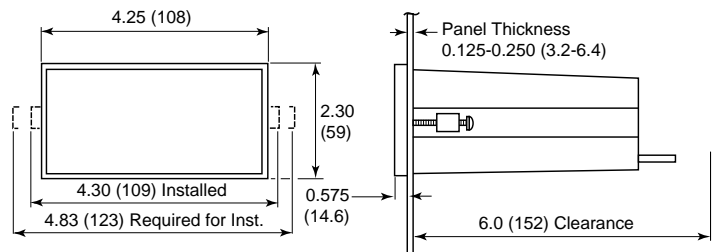
### Option Card Pin-outs

Pin:	Function:	
J1 { 1	Transmitter +	] PD175
2	Transmitter -	
J2 { 1	Relay #1 Common	] PD176
2	Relay #1 NC	
3	Relay #1 NO	] PD174
4	Relay #2 Common	
5	Relay #2 NC	] PD178
6	Relay #2 NO	
J3 { 1	Relay #3 Common	] PD177
2	Relay #3 NC	
3	Relay #3 NO	] PD178
4	Relay #4 Common	
5	Relay #4 NC	] PD177
6	Relay #4 NO	

Notes:

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

## 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

## SPECIFICATIONS

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

### General

- Inputs:** Field selectable: 0-30 mV, 0-200 mV, ±15 mV ±100 mV
- Display:** 0.56" (14.2 mm) red LED, 4½ digits + extra zero may be switched on to display ±19,999(0)
- Accuracy:** 0.05% FS ±1 count
- Ratiometric Operation:** Deviation less than 0.1% FS ±1 count, with ±10% variation in excitation voltage
- Zero Stability:** 0.5 µV/°C
- Span Stability:** 0.005% FS/°C
- Front Panel:** NEMA 4X, IP65; panel gasket provided
- Calibration Range:** User programmable over entire range of meter
- Input Impedance:** 20 kΩ
- Sensor Power Supply:** Isolated, selectable: 5 VDC or 10 VDC ±5% @ 50 mA; or 24 VDC ±5% @ 20 mA. Available for either strain gauge input or 4-20 mA output option, but not both.
- Max Display (Peak):** Stored until reset by user or meter is turned off
- Max Display Indication:** Front panel LED
- Tare:** Capture Tare - Sets current display to Zero via front panel TARE button. Programmable Tare - Automatically sets TARE to a programmable preset value.
- Tare Indication:** Front panel LED
- Non-Volatile Memory:** Settings stored for a minimum of 10 years.
- Lockout:** Switch 8 restricts modification of programmed settings.
- Power Options:** 115 VAC or 230 VAC ±10%, 50/60 Hz, 10 VA
- Isolation:** 1500 VAC
- Normal Mode Rejection:** 64 dB at 50/60 Hz
- 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% FS, 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.

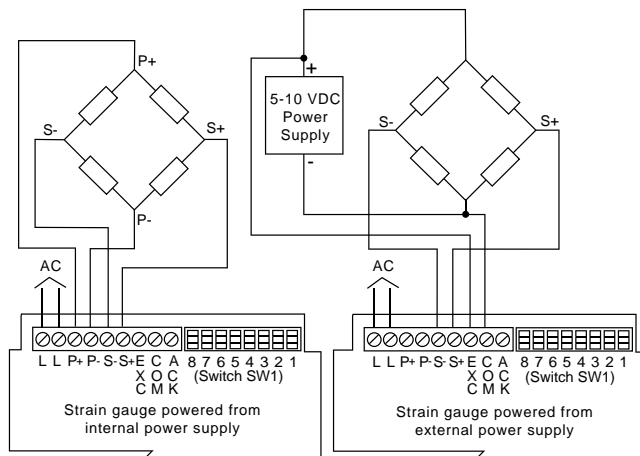
## ORDERING INFORMATION

115 VAC Model	230 VAC Model	Options Installed	Option Card*
PD691-3-N	PD691-4-N	None	
PD691-3-14	PD691-4-14	2 Relays	PD174
PD691-3-15	PD691-4-15	4-20 mA Output	PD175
PD691-3-16	PD691-4-16	2 Relays + 4-20 mA Output	PD176
PD691-3-17	PD691-4-17	4 Relays	PD177
PD691-3-18	PD691-4-18	4 Relays + 4-20 mA Output	PD178

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

## Power Supply Wiring Diagrams

The internal power supply can provide either 5, 10, or 24 VDC.



## Relays

- Rating:** 2 or 4 Form C (SPDT); rated 2 A @ 30 VDC or 2 A @ 250 VAC resistive load; 1/14 HP @ 125/250 VAC inductive loads
- Reset:** User selectable
  1. Automatic when the input passes the reset point.
  2. Automatic plus manual (via user supplied switch). Manual reset resets all manually resettable relays.
- Fail-Safe Operation:** Relay coils are energized in non-alarm condition. In case of power failure, relays will go to alarm state. Fail-safe may be disabled with internal jumper.
- Auto Initialization:** When power is applied to the meter, the relays will always reflect the state of the input to the meter.
- Deadband:** 0-100%, user selectable

## Isolated 4-20 mA Transmitter Output

- Scaling Range:** Anywhere in range of meter, 501 count minimum span; reverse scaling allowed.
- Accuracy:** ±0.1% FS ±0.004 mA
- Output Loop Resistance:**

Power supply	Loop Resistance	
	Minimum	Maximum
24 VDC	10 Ω	600 Ω
35 VDC (external)	600 Ω	1000 Ω

**Isolation:** 500 V input-to-output or input/output-to-24 VDC supply  
**External Loop Power Supply:** 35 VDC maximum

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