

## MODEL 800 DIGITAL PRESSURE GAUGE



Perma-Cal® Industries, Inc. Model 800 Digital Pressure Gauge family features Grade 4A accuracy in a standard 1/8 DIN case size. Table top and panel mount configurations are available in 0-30 psi through 0-200 psi and several metric equivalents. Differential pressure ranges are also available. The gauge complies with the new ASME B40.7 specification.

### Features ...

- ± .1% F.S. accuracy @ 72 °F (Most Ranges)
- Temperature compensated 32 °F to 122 °F ( 0°C to 50°C )
- No Zero Drift
- 4½ Digit LED display
- RS232 serial interface standard
- Standard 1/8 DIN case size
- Accessory interface allows for external control
- External sample and hold function
- 3 programmable outputs
- PSI, PSID, kPa, BAR & inH<sub>2</sub>O ranges available
- Panel and bench mount configurations

## PRESSURE RANGES

Pressure Range	Code <sup>1</sup>	Accuracy <sup>2</sup>	Over Range <sup>3</sup>	Outputs <sup>4</sup>		
				X	Y	Z
0 - 30 PSIG	02	±.05 psi from 3 to 30 psi	> 34 psi	27 psi	15 psi	3 psi
0 - 100 PSIG	04	±.1 psi from 3 to 100 psi	> 111 psi	100 psi	50 psi	3 psi
0 - 200 PSIG <sup>5</sup>	06	±.2 psi from 5 to 195 psi	>= 200 psi	195 psi	100 psi	5 psi
0 - 100 PSID	05	±.15 psi from -50 to +50 psid	> 111 psid	100 psid	50 psid	5 psid
0 - 200 PSID <sup>5</sup>	07	±.25 psi from -100 to +100 psid	>= 200 psid	195 psid	100 psid	10 psid
-15 - 30 PSIG	27	±.05 psi from -10 to 30 psi	> 34 psi	27 psi	15 psi	3 psi
-15 - 100 PSIG	29	±.1 psi from 3 to 100 psi	> 111 psi	100 psi	50 psi	3 psi
0 - 1000 kPa	35	±1 kPa from 50 to 1000 kPa	>1300 kPa	1000 kPa	500 kPa	50 kPa
0 - 10 BAR	44	±.01 bar from .5 to 10 bar	>13 bar	10 bar	5 bar	.5 bar
0 - 1000 inH <sub>2</sub> O	60	±1 inH <sub>2</sub> O from 41 to 814 inH <sub>2</sub> O	>1000 inH <sub>2</sub> O	814 inH <sub>2</sub> O	407 inH <sub>2</sub> O	41 inH <sub>2</sub> O

Figure 1

Notes:

1. Code placed in the part number to indicate the pressure range desired. See Figure 7.
2. At 69°F - 75°F excluding hysteresis.
3. The pressure at which the Over Range indication occurs.
4. The pressure at which the output goes high and stays high. In the case of the Z output, the point above zero where the output goes low. Special orders can change these values.
5. Maximum displayed reading is 199.99 psi,
6. Specifications subject to change without notice.

## CASE DIMENSIONS

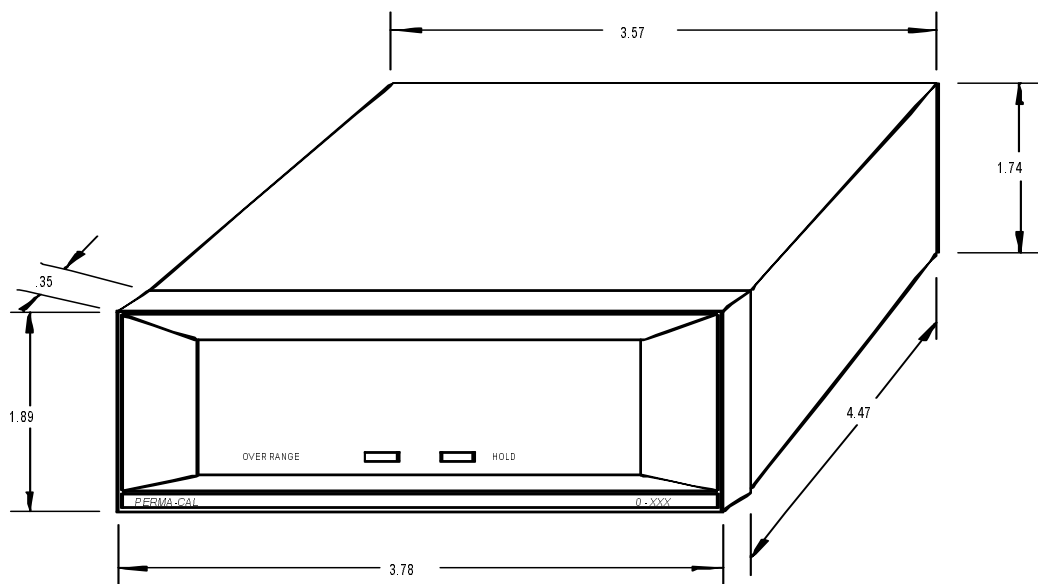


Figure 2

## DEVICE CONNECTIONS

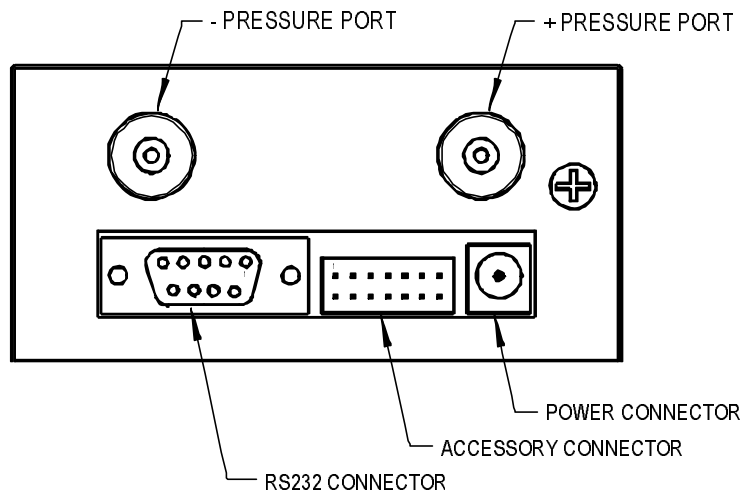


Figure 3

### Pressure Ports ...

Two types of ports are available; Barbed style or 1/8 NPT (male) which are located on the back of the Instrument (See Figure 3). Material is CDA360 Brass. The negative port is present only with differential pressure ranges, in all other cases this location is plugged. The barbed port accepts .18 ID tubing. It is the responsibility of the user to use the proper tubing for the application. Note: The Barbed style is not recommended for pressure ranges above 100 psig. A vacuum applied to the positive pressure port will not harm the device.

### RS232 Connection ...

The RS232 port transmits data in the standard asynchronous format of 8N1 (8 data bits, no parity and 1 stop bit). The data is output in a continuous stream with a space (32 hex) prefix, 7 data bytes, a carriage return (13 hex), and a line feed (10 hex) suffix (10 total bytes). No handshaking is available. The output voltage levels are not compliant with the RS-232-E requirement that the signal levels be at  $\pm 5$  volts minimum when terminated by a 3k ohm load. However, Typically  $> 4$  volts will be present when spacing and  $< -4$  volts will be present when marking. Since most RS-232 receivers will correctly interpret  $> 2$  volts as a space, and  $< .5$  volts as a mark, in most cases there will be no problem reading the data. This port allows the use of a standard 9 pin serial cable, however only pins 2 and 5 wired straight through are necessary to directly connect to a PC. Selection of various baud rates and polarities are available through the Accessory Interface (AI) as well as a TTL level serial port. See Figure 5.

Software to monitor the output of the Gauge on a Windows® PC is available on line at [www.perma-cal.com](http://www.perma-cal.com). This software can convert the native output of the Gauge to many common engineering units including PSI, kPa, BAR, inH<sub>2</sub>O, inHg, mmHg, FSW, kg\cm<sup>2</sup> and ATM. Perma-Cal does not provide software for data logging, however commercially available serial interface software such as SoftwareWedge™ by TAL Technologies performs well.

### Accessory Interface ...

The Accessory Interface (AI) consists of a 14 pin connector located in the rear center of the gauge. Through the AI, power can be supplied to the unit (bypassing the power connector), conversion timing can be controlled, TTL level serial data is present (bypassing the 9 pin D connector), serial baud rate can be controlled, and three TTL level outputs are available, as described in Figures 1 and 4.

## Accessory Interface Pin Function

Pin #	Function	Pin #	Function
1	TTL level serial data out	8	Gnd
2	TTL level serial data in (Future)	9	DO NOT CONNECT - Factory only
3	Baud rate select (4.7KΩ pull up)	10	Baud rate select (4.7KΩ pull up)
4	Run / Hold input (4.7KΩ pull up)	11	Rn / Hd handshake output (4.7KΩ pu)
5	X output (10KΩ pull up)	12	Y output (10KΩ pull up)
6	Z output (10KΩ pull up)	13	DO NOT CONNECT - Factory only
7	+V in (8.0 VDC to 13.5 VDC)	14	Gnd

Pins are numbered left to right, top to bottom. Mating connector Hirose Electric Co. Ltd. P/N DF1B-14DS-2.5RC  
 Note: The mating connector for the AI is a Hirose Electric Co. Ltd. P/N DF1B-14DS-2.5RC. If desired, indicate it as a separate line item on your P.O. or purchase directly from Digi-Key Corp. P/N's H3815-ND & HD3828-ND.

Figure 4

### AI functional and electrical details ...

Pin 1: This pin sends data out in the standard asynchronous format of 8N1 (8 data bits, no parity and 1 stop bit). The data is output in a continuous stream with a space (32 hex) prefix, 7 data bytes, a carriage return (13 hex), and a line feed (10 hex) suffix (10 total bytes). No handshaking is available. The output voltage levels are standard TTL and inverted. Thus a space is < .5 volts and a mark is > 2.5 volts.

Pin 2: This pin is currently not used but has been reserved for later firmware upgrades which may allow bidirectional communication. It is best to leave this pin unconnected.

Pins 3, & 10: These inputs allow control of the serial baud rate. With the pins left unconnected, the baud rate defaults to 9600 true polarity. If a different transmission rate or inverted polarity is desired, these inputs should be mechanically switched or hard-wired to ground. See the paragraph above on the RS232 interface for further details. Some serial ports require an inverted signal to function properly. If you are connecting to a PC serial port via the AI connector, invert the signal.

Baud Rate	Jump AI pins to Gnd
1200 - True	3
9600 - True	None (Default)
1200 - Inverted	10
9600 - Inverted	3 and 10

The state of these inputs are read during the POST\*. Therefore, the baud rate cannot be changed on-the-fly. You must power down the instrument, set the inputs, then reapply power to change the baud rate. \* Power On Self Test

Figure 5

Pin 4: This input incorporates a 4.7KΩ pull up. When high, the device free runs (default) and displays new data approximately four times per second. A conventional common collector transistor configuration, TTL signal, or switch contact can pull the input low and force the device into hold mode. When in the hold mode, the gauge continuously displays and serially transmits the last data obtained. Handshake is pin 11.

Pins 5, 6, 12: These outputs are factory programmed to change state at the pressures indicated in Figure 1 above. Each output can sink or source 15ma @ TTL levels. Custom programming of these outputs can be requested at the time of purchase for an additional charge. NOTE: DO NOT depend on these outputs as safety or emergency stop signals. See the warning below.

Pin 7: This pin can be used as an alternative to the power port. +8.0vdc to +13.5vdc @ 125ma is required. Do not connect power to this pin and the power port simultaneously.

Pin 11: The handshake for pin 4. Signals the device controlling the Run / Hold input (if one exists) that a hold has been received by going high and remaining high until the Run / Hold input changes state. This output is pulled up with a 4.7KΩ resistor and can sink or source 5ma @ TTL levels.

#### Power Port ...

2.1 mm positive center power jack. 7.5 to 12 VDC @ 125ma. A 9VDC, 125ma power adapter is supplied. The power port may be bypassed by using the Accessory Interface. See the discussion above concerning pin 7.

#### Display Information ...

The gauge employs a 4½ digit .56in LED display. Leading zeros are suppressed except for those adjacent to the decimal point. Two annunciator LEDs are employed to indicate Over Range and when the gauge is in the Hold mode. See Figure 6.

Display Indicates	Indication Means ...
'-----'	A/D Converter Overflow. To remedy reduce pressure; the display will restore itself in approximately 10 seconds.
Flashing Over Range Annunciator	The inlet pressure has exceeded the Over Range pressure. See Figure 1. Prolonged exposure to this pressure will degrade accuracy.
Flashing Hold Annunciator	Display is in Hold mode and therefore may not be indicating the current inlet pressure. Figure 4, Pin 4.

Note: If negative pressure (a vacuum) is applied to the positive pressure port and the gauge is not of compound or differential type, the display will indicate zero. The gauge will not be harmed.

Figure 6

## ORDERING INFORMATION

Build the desired part number by following the template below:

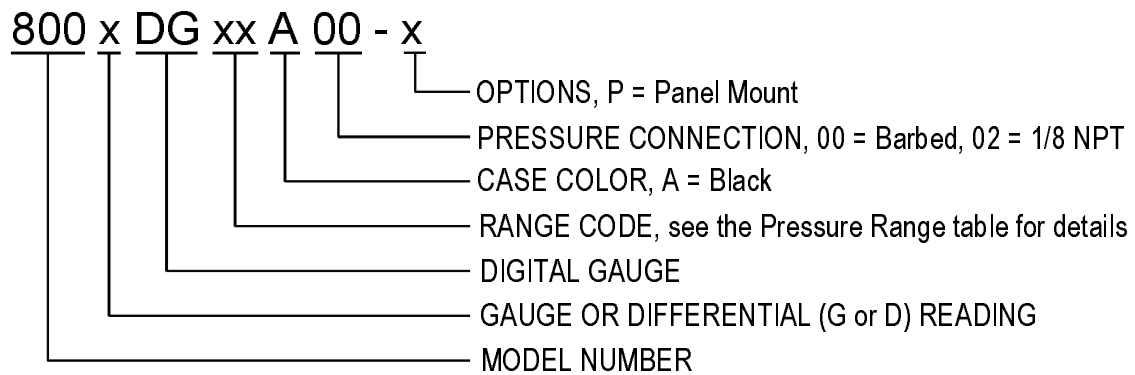


Figure 7

## CHEMICAL COMPATIBILITY

Limited to those media which will not attack polyetherimide, silicon, silicon dioxide, fluorosilicone, ETFE (Tefzel) and brass. **NOT FOR OXYGEN USE.**

## RoHS COMPLIANCE

This device is not RoHS compliant.

## ENCLOSURE RATINGS

This device is designed for indoor use only. IP40 OR NEMA 1.

## WARNING ... PERSONAL INJURY

**DO NOT USE** these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury. Failure to comply with these instructions could result in serious injury or death.

## WARRANTY / REMEDY

Perma-Cal warrants goods of its manufacture as being free of defective materials and faulty workmanship for a period of one year. If warranted goods are returned to Perma-Cal, freight prepaid, during the period of coverage, Perma-Cal will repair or replace, at its option, without charge those items it finds defective. Over Pressure, even if accidental, is not warranted. The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose.

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