

# Ω OMEGA ENGINEERING, INC.

## Digital Pressure Gauges

DPG1000L Series, 4-20mA Current Loop Powered

INSTRUCTION  
SHEET

M3360/1001



### Description

The **DPG1000L** is a 2-wire pressure transmitter with digital display. It is powered by the 4-20 mA current loop and produces a true analog output signal. The output is filtered to improve noise immunity. The temperature compensated piezoresistive transducer features 316 stainless steel wetted parts.

### Installation Precautions

Tighten/remove with wrench on hex fitting only. Do not attempt to rotate gauge by turning housing. Use fittings appropriate for the pressure range of the gauge. Do not apply vacuum to gauges not designed for vacuum operation. **NEVER** insert objects into the gauge port or blow out with compressed air. Permanent damage not covered by warranty will result.

### Electrical Connection

Connection to the **DPG1000L** is made with the 2-wire cable at the gauge rear. Connect the loop (+) supply to the RED lead and the loop (-) supply to the BLACK lead. Reversing the connections will not harm the gauge but the gauge will not operate with incorrect polarity.

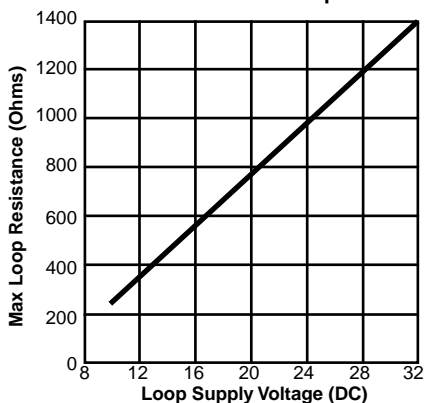
### Loop Voltage

Select a loop power supply voltage and total loop resistance so that when the loop current is 20 mA, the gauge will have at least 8 VDC at its terminals. Too large a loop resistance will cause the gauge output to "limit" or saturate before reaching its full 20 mA output. See graph below.

The **minimum** loop supply voltage may be calculated from the formula:

$$V_{\min} = 8V + (20\text{mA} \times \text{Total loop resistance})$$

Voltage Compliance for  
4-20 mA Current Loop



### SPECIFICATIONS

#### Ranges & Resolution

30.0 inHg vacuum, ±15.00, 3.00, 5.00, 15.00, 30.0 psig  
100.0, 199.9, 300, 500, 1000, 3000, 5000 psig  
Absolute reference: 15.00, 100.0 psia

#### Optional Units

Most engineering units such as kPa, atm, bar, mbar, inHg, mmHg, inH<sub>2</sub>O, ftH<sub>2</sub>O, torr, kg/cm<sup>2</sup>, cmH<sub>2</sub>O, oz/in<sup>2</sup>

#### Display (type, size, update rate)

Ranges up to 1999: 3½ digit LCD, ½" digit height  
3000 and 5000 psi ranges: 4 digit LCD, 0.4" digit height  
3 readings per second nominal display update

#### Accuracy (linearity, hysteresis, repeatability)

±0.25% of full scale or better, ±1 least significant digit

#### Output Characteristics

True analog output, 50 millisecond typical response time

If the terminal voltage of the gauge falls below about 7.8 VDC erroneous reading or erratic operation may occur. This indicates that the loop supply/resistance may not have adequate headroom for reliable operation. This should never occur in normal use. If it does, check loop supply and resistance.

### Operation

The **DPG1000L** is designed for continuous operation. Warm-up time is negligible. The display will show the system pressure/vacuum, and the loop current also will be proportional to the system pressure/vacuum; 4 mA = Zero or low end, 20 mA = Span, full-scale or high end.

### TEST Button

When the TEST button is held depressed, the display and loop current are switched to a test level determined by the setting of the Test potentiometer. This test mode will allow setup and testing of the current loop by switching to this test level whenever desired without having to alter the system pressure.

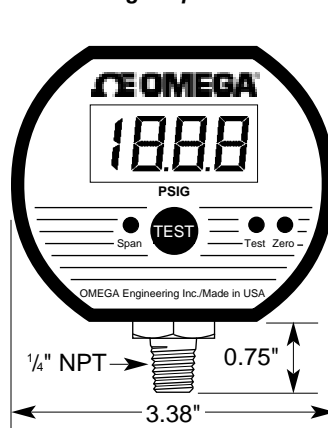
To set the test output level, see gauge label for location of Test potentiometer. Press and hold the front-panel TEST button and adjust the Test potentiometer to set the display and loop current to the desired test level.

### Calibration

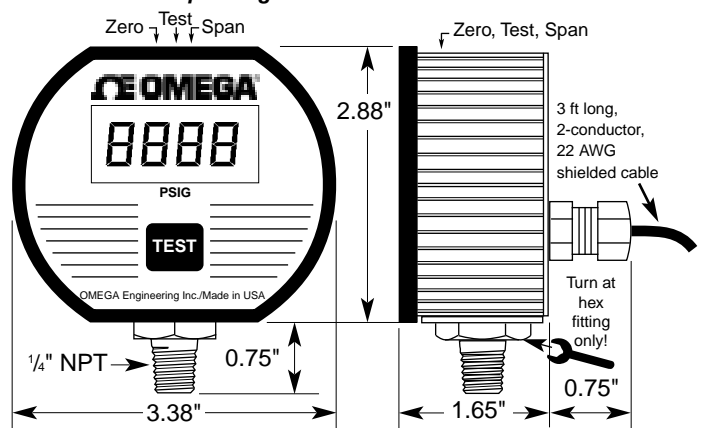
See gauge label for location of individual controls to adjust the zero and span of the display.

**GAUGE reference** units may be re-zeroed without affecting the span calibration. The gauge port must be open to the ambient with no pressure or vacuum applied. Adjust the Zero control until the gauge reads zero with the minus (-) sign occasionally flashing.

Ranges up to 1999



3000 and 5000 psi ranges



#### Loop Supply Voltage

Any DC supply/loop resistance that maintains 8 to 32 VDC at gauge terminals. Reverse polarity protected.

#### Low Loop Warning (below approximately 7.8 VDC)

Ranges up to 1999: Colon appears  
3000 and 5000 psi ranges: All decimal points flash

#### Controls & Location

TEST button sets output to test level, 0-100% range

Internal potentiometers: Loop 4 mA and 20 mA

Ranges up to 1999: Front zero, span & test pots

3000 and 5000 psi ranges: Top zero, span & test pots

All models: Non-interactive zero & span, ±10% range

#### Temperature Stability (relative to 77°F or 25°C)

±1% FS for offset & span, 32 to 158°F (0 to 70°C) typical  
±2% FS for offset & span, 32 to 158°F (0 to 70°C) typical  
for 3 and 5 psi ranges

Span calibration should only be attempted if the user has access to a pressure reference of known accuracy. The calibration equipment should be at least four times the gauge accuracy. Zero calibration must be done before span calibration. Record readings at three to five points over the range of gauge and adjust span control to minimize error and meet specifications.

**ABSOLUTE reference** gauges require vacuum generation and atmospheric pressure measurement equipment for accurate calibration and thus are more difficult to calibrate in the field. Gauges may be returned to Omega Engineering for recalibration. N.I.S.T. traceability is available.

The **DPG1000L** has internal controls to adjust the agreement between the displayed value and the 4-20 mA loop current. These are set at the factory and should not normally be adjusted. If adjustment is necessary, the display zero/span must be accurately set first. Then, after removing the rear cover, the Loop Zero and Loop Span controls may be trimmed for 4.00 mA of loop current at the low end of the range, and 20.00 mA at the high end of the range, respectively. Accurate pressure generation and measurement and current measurement equipment are required to successfully complete this calibration.

#### Weight (approximate)

Gauge: 9 ounces, shipping weight: 1 pound

#### Housing

Extruded aluminum case, light gray epoxy powder coated  
Black polycarbonate cover, front and rear gaskets

#### Pressure/Vacuum Connection & Material

¼" NPT male, all wetted parts are 316 SS

#### Overpressure & Burst

5000 psig for 3000 psig range

7500 psig for 5000 psig range

All others 2x rated pressure minimum

Burst: 4x rated pressure minimum or 10,000 psi, whichever is less

**Storage temperature:** -40 to 203°F (-40 to 95°C)

**Operating temperature:** -4 to 185°F (-20 to 85°C)

**Compensated temperature:** 32 to 158°F (0 to 70°C)



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WARNING: These products are not designed for use in, and should not be used for, patient connected applications.



**WARRANTY/DISCLAIMER**

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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**RETURN REQUESTS / INQUIRIES**

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. P.O. number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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