OMEGA ENGINEERING, INC.

Digital Pressure Gauges

DPG1100L Series, NEMA 4X, 4-20mA Current Loop Powered

INSTRUCTION SHEET

M3764/1101

Description

The **DPG1100L** 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 **DPG1100L** 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.

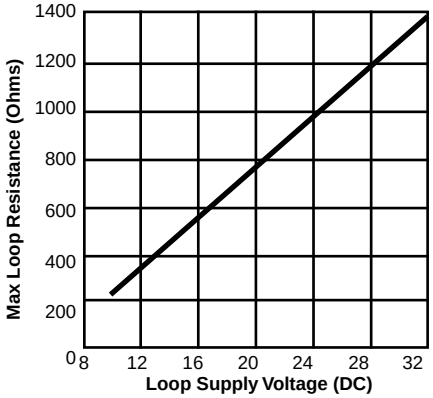
Loop Voltage

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:

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

Voltage Compliance for 4-20 mA Current Loop



If the terminal voltage of the gauge falls below about 7.8 VDC erroneous reading or erratic operation may occur. This is 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 **DPG1100L** 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 the gauge label for the location of the 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

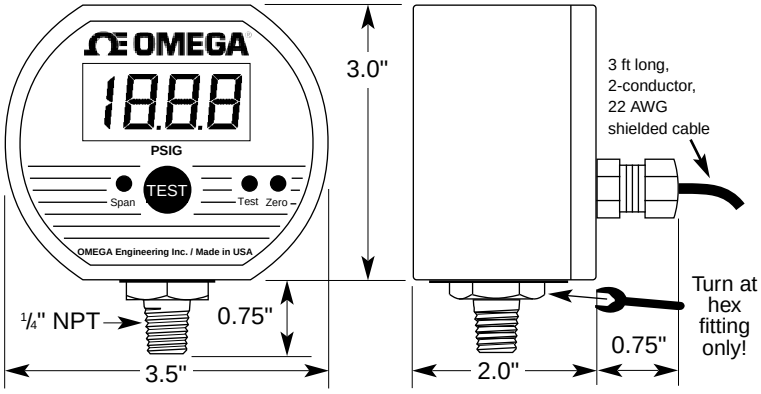
See gauge label for location of individual controls to adjust the zero and span of the display.

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.

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 **DPG1100L** 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.



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 psig
Absolute reference: 15.00, 100.0 psia

Optional Units

Most engineering units such as kPa, atm, bar, mbar, inHg, mmHg, inH_2O, ftH_2O, torr, kg/cm^2, cmH_2O, oz/in^2

Display (type, size, update rate)

3½ digit LCD, ½" digit height
3 readings per second nominal display update

Accuracy (linearity, hysteresis, repeatability)

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

Loop Supply Voltage

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

Output Characteristics

True analog output, 50 millisecond typical response time

Low Loop Warning (below approximately 7.8 VDC)

Colon appears on display

Controls & Location

TEST button sets output to test level, 0-100% range
Front zero, span & test potentiometers
Non-interactive zero & span, ±10% range
Internal potentiometers: Loop 4 mA and 20 mA

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

Weight (approximate)

Gauge: 9 ounces, shipping weight: 1 pound

Housing

NEMA 4X
UV stabilized polycarbonate/ABS case, light gray color
Clear polycarbonate window to protect display
Gasketed rear cover, six captive stainless steel screws

Pressure/Vacuum Connection & Material

¼" NPT male, all wetted parts are 316 SS

Overpressure & Burst

5000 psig for metric units equivilant to 3000 psig
7500 psig for metric units equivilant to 5000 psig
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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MADE IN USA

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.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

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.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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