User's Guide

An OMEGA Technologies Company
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GP911 Series

Analog Gaging Transducers

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OMEGA®

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Product Description

Description

Omega Gaging Transducers are high precision measurement probes intended for all Gaging applications demanding high accuracy and a high degree of repeatability. The one piece parallel body houses a precision linear ball sleeve bearing assembly, anti-rotation guide and the choice of either a half bridge or a L.V.D.T. winding, a combination which adds up to an extremely versatile, accurate and cost effective measurement solution.

Installation Recommendations

Location & Clamping

L.V.D.T. Gaging transducers generally are a reliable and proven technology that is well established in all areas of manufacturing and quality control. The majority of the associated problems experienced with their application and use are totally avoidable, particularly if sufficient thought is given during the initial design stages of equipment, to the position and clamping methods employed for these measuring elements.

L.V.D.T.'s being of inductive nature are susceptible to some degree to the influence of magnetic fields and therefore should be positioned well away from electric motors, relays and permanent magnets, where this is not possible then magnetic shielding should be considered as an alternative.

Clamping of the probe body should be carefully considered, ideally the body of the transducer should be clamped in a pinch or yoke type clamp, if this is not possible then the introduction of a load spreading bush between body and clamp is a preferred alternative.

Irrespective of clamping method care must be taken not to overtighten retaining screws as distortion of the body may prove damaging to the integrity of the transducer and adversely effect the geometry of the installation.

Where single point screw clamping is adopted then the tightening torque employed should be limited to that which will give a maximum of 50Kg point load. The typical maximum torque for an M5x0.8mm or a 10-32UNF screw would be approximately 0.27Nm.

Tip Tightness

Standard measuring tips are factory tightened to a torque of between 0.18Nm and 0.22Nm, this is sufficient to prevent loosening of the tip in use, but well within the damage threshold of the anti-rotation mechanism. It is recommended that replacement tips are tightened to the prescribed torque limits with the shaft fully retracted. A proprietary thread locking anaerobic sealant may be used sparingly if desired.

Zero Adjustment

This is best achieved by first positioning the Gage master, zeroing any electrical offset control, selecting the course set gain and moving the Gaging probe into contact with the master until the reading comes onto the scale. Gently tighten the clamp until it is just possible to ”fidget” the probe manually towards the zero indication.

As zero is approached, the instrument gain may be increased; when the zero point is within the range of the zero offset controls the clamp must be fully tightened. Any standard Omega probe used over the whole of its rated stroke should be mechanically set to within 0.004” (0.10mm) of true zero, if the measuring range is less than the rated stroke then the setting tolerance may be increased proportionally to within the limits of the available electrical offset.

Cable

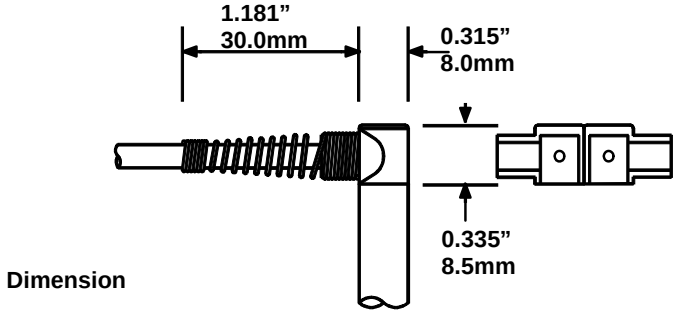
The transducer cable is specially manufactured to company specification to achieve the optimum balance between flex life, flexibility, chemical resistance, abrasion resistance and electrical characteristics such as electrostatic screening.

The following precautions will minimize transducer failure due to cable damage.

Cable runs should be positioned well clear of moving components and vulnerable working areas. If the cable is in a flex situation then a minimum bend radius of 6” (150mm) should be maintained, the vacuum and pneumatic options should not be flexed from the transducer cable entry, but should be anchored separately at a position of 2-3” (50-75mm) from the end cap.

Specials

All non-pneumatic probes are provided with a cable strain relief spring as standard. This feature allows the user to retrospectively install a right angle cable outlet to aid space or cable routing restrictions.



Pneumatic Options

The Gaging tip of pneumatic probes is normally biased in the inward direction and extension of the tip is achieved by applying air pressure to the probe nozzle.

Air pressure may be varied within the specified limits to achieve the desired tip force at zero. The pneumatic probes are designed to be leak free and of small volume to minimize the air flow requirements and maintain a consistent tip force. Care must be taken not to damage the bellows seal as the satisfactory operation of the probe is entirely dependent on this component. A working clearance around the bellows equivalent to a 0.375” (9.5mm) dia. hole is desirable. To maximize the working life of the probes the air supply should be both clean and dry; i.e. filtered to better than 0.0002” (5 microns) and with a relative humidity of less than 60%.

Operating Pressure Range for Standard Products : 0.4 Bar (6 psi) to 1.0 Bar (14 psi)

Vacuum Option

The Gaging tip of the vacuum operated probes is normally biased in the outward direction and retracted by the application of negative pressure within the specified ranges at the probe nozzle. Care must be taken not to damage the bellows seal as the satisfactory operation of the probe is entirely dependent on this component. Probes may be operated from a pumped system or individually from a hand operated bulb.

Operating Pressure for Standard Products : 0.27 Bar (4 psi) maximum

Adjustable Pretravel Option

The option for adjustable pretravel is provided to maximize probe life and minimize component damage where side application of the Gaged component is necessary. Pretravel should be adjusted for minimum lift of the probe tip necessary for a satisfactory Gaging operation within the tolerance of the Gaged component.

Pretravel should only be adjusted using the spanner. (ordered separately)

The pretravel adjustment is not provided as a means of fine mechanical zero control, although it is possible to be used as such. Excessive use of the facility for zero adjustment can result in loss of electrical datum, resulting in possible damage to the internal stops.

Environmental Considerations

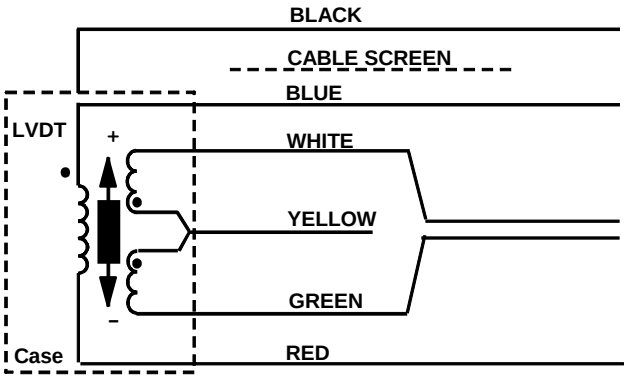
All non-pneumatic Gaging probes are specified to operate from +14°F to 176°F (-10°C to +80°C) and all pneumatic probes from 41°F to 176°F (+5°C to +80°C). At the low temperature extremes it may be necessary, due to stiffening, to remove the rubber gaiter to achieve satisfactory operation. In this case the atmosphere must be both clean and dry. However, continued operation without the gaiter is not recommended due to the damage caused by the ingress of dirt. Use of the transducer without the gaiter invalidates warranty. Omega probes are designed to withstand the rigors of in-process Gaging and will operate satisfactorily in the presence of copious amounts of coolants and cleaning solvents.

Electrical Connections for Use with Omega Electronics

Quadrature Resistor

These are supplied, where necessary to minimize residual voltage at null and should be fitted as follows:
L.V.D.T.: Between yellow and white or yellow and green depending on phase (see calibration sheet for details). Yellow wire is not connected in optional factory fitted plugs.

Half-Bridge: Between yellow and red or yellow and blue (see calibration sheet for details).



W-Series Application Notes

When applying these probes the following pertinent points need to be observed in order to maintain the specification and to maintain continued reliable operation:

1) Air supply must be clean and dry, ie. Max 60% RH and filtered to particle size of 0.1 □m.

2) The operating environment must be clean and dry. Viscous materials contaminating the probe shaft can inhibit operation and/or negate the properties of the low viscosity synthetic lubricating oils employed.

3) Replacing a contact tip should be approached with caution, the bearing assembly by default is delicate and any undue force can potentially damage the unit resulting in loss of free movement. Maximum tightening torque is 12–15 cNm. It is advised that the original supplier replace or fit custom tips, this ensures that the probe after testing will operate to specification, also if the mass of the tip differs from standard then any variance to the specification can be advised.

4) It is not recommended that the W-Series probes are subjected to side loading, as this can considerably shorten the useful working life.

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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 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 malfunctions, 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 having been 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, EXPRESS 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. Purchase Order 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. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the 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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- ❒ Recorders, Controllers & Process Monitors
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