

User's Guide



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LD340 Series **AC Miniature LVDT** **Displacement Transducers**



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Germany/Austria: Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678 TEL: +49 (0) 7059 9398-0
FAX: +49 (0) 7056 9398-29 e-mail: info@omega.de

United Kingdom: OMEGA Engineering Ltd.
ISO 9001 Certified One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488 TEL: +44 (0)161 777-6611
FAX: +44 (0)161 777-6622 e-mail: sales@omega.co.uk

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

GENERAL

The AC miniature series of 9.5 mm (3/8") diameter AC operated LVDT's are; Small Size, Precision Position Sensors for both OEM's and End Users. While Ideal for space restrictive applications, their epoxy bonded construction also make them suitable for operation in *wet or oily environments and their light weight cores are perfect for dynamic measurement.

* Not suitable for total immersion.

1.1 Introduction

The AC miniature range of transducers operate on the L.V.D.T. principal, where movement of a core inside the transducer body is detected by a differential change in output on two secondary coils, the primary coil(s) being energised by an appropriate AC signal. With the core in a central position, the coupling from the primary to each secondary is equal and opposite and therefore cancel out, thus the resultant output voltage is zero. As the core is displaced further into one secondary, its voltage increases proportionally and the other secondary voltage decreases hence the output changes in magnitude and phase in proportion to movement in either direction from null.

The red and white connections are in phase for inward movement (ie. towards the cable end).

The output signal depends on both core movement and energisation voltage and is expressed as a sensitivity in mV output / V energising / mm travel.

1.2 Installation

L.V.D.T. transducers generally are a reliable and proven technology that is well established in all areas of manufacturing and control industries. 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 positioning and clamping methods employed for these feedback 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 coil assembly should be carefully considered, some example methods are shown in figure 1. Ideally the body of the transducers should be clamped centrally in a pinch or yoke type clamp, manufactured from a low conductivity, non-magnetic material, if this is not possible then the introduction of a non-metallic bush between body and clamp is a preferred alternative.

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

If the L.V.D.T. is to be mounted on equipment subject to high "g" then dependent on the direction of these forces, it may be advantageous to consider end to end clamping in preference to over body clamping.

The magnetic core supplied with each transducer has been manufactured and heat treated to achieve the optimum magnetic performance, any subsequent handling of the core which results in stress being imparted will render the calibration void, this includes over tightening of the core during installation onto its carrier. Hand tightening and retention by means of a suitable thread locking anaerobic retainer is the recommended procedure.

1.3. Guided Carrier

1.3.1.MOUNTING Normal mounting methods apply (see section 1.2. on Installation). Careful consideration should be given to alignment, the carrier must be able to move freely within the transducer core. Side force should be kept to a minimal level.

1.3.2.MAINTENANCE: Check for free movement of the carrier when in the vertical plane. Lubrication is provided via an oilite bush which is impregnated with molybdenum disulphide and in normal usage is maintenance free.

1.4. Ball Tip Option

This option is for use with the Guided Carrier and is attached to the threaded end of the core carrier. Side forces which may exert undue pressure and flex the carrier must be avoided.

1.5. Rod End Bearings Option

1.5.1.MOUNTING: May be mounted in any axis; it is recommended that the rear rod end bearing (near cable exit) is mounted on the static component.

1.5.2.MAINTENANCE: Rod end bearings are supplied pre-lubricated with mineral oil; for higher temperature applications the use of a molybdenum disulphide impregnated oil is recommended and your representative should be consulted about the maximum temperature. Periodic inspection of locking screws and nuts etc. is advisable depending upon the Customer's application. Rod end bearings should be able to move freely and have minimal side play.

1.6. Cable

Cable is specially manufactured to optimise performance with respect to temperature, chemical resistance, flex life, abrasion resistance and electrical performance. However, no single cable design can fulfil every known requirement and by taking a few simple precautions cable failure can be avoided. In flexure conditions then a minimum bend radius of 150 mm should be maintained. Avoid contact with sharp edges and rough surfaces and inspect at periodic intervals.

Excessive cable runs may alter the output characteristics; if in doubt consult your representative.

Routing of cables should be kept as smooth as possible avoiding burrs, sharp edges and excessive cable loads.

1.7 Environmental

Operating Temperature Range -55 °C / +150 °C
 Storage Temperature Range -55 °C / +150 °C
 Conditions of high humidity and vibration should be avoided.

Figure 1 **Examples of Clamping Methods**

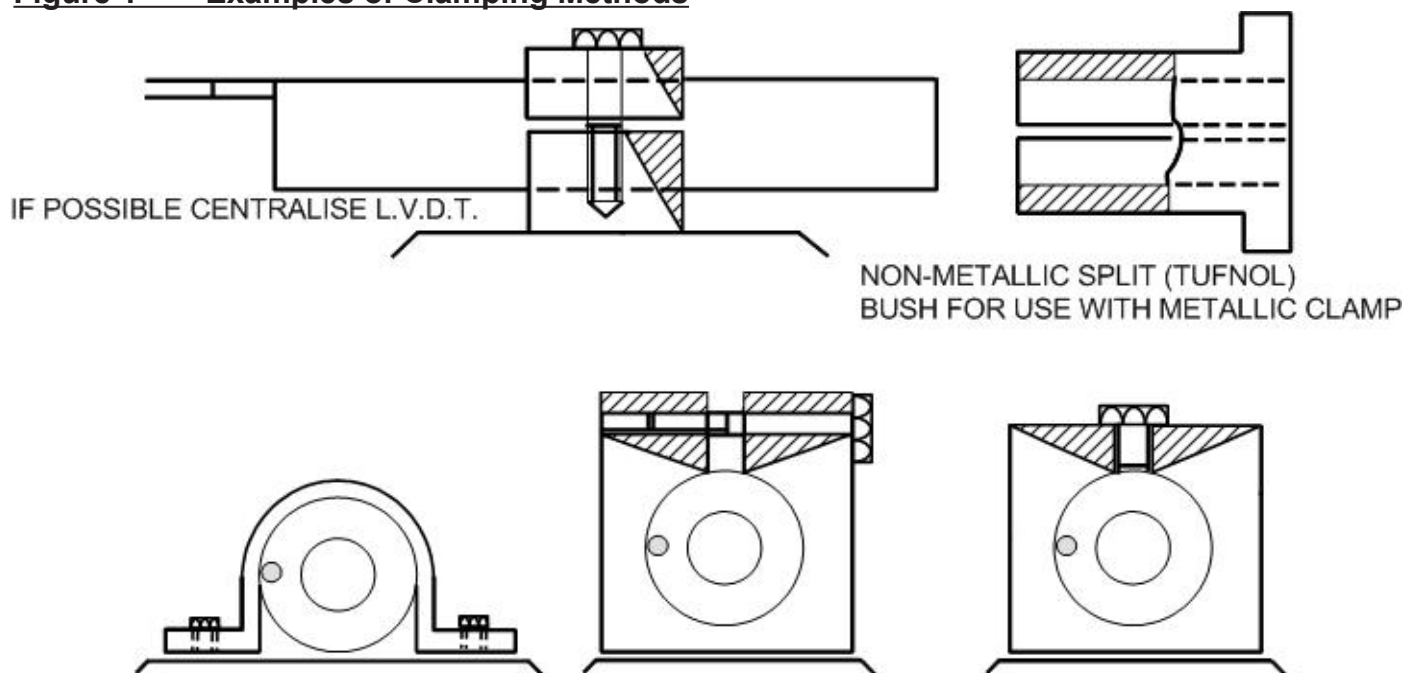


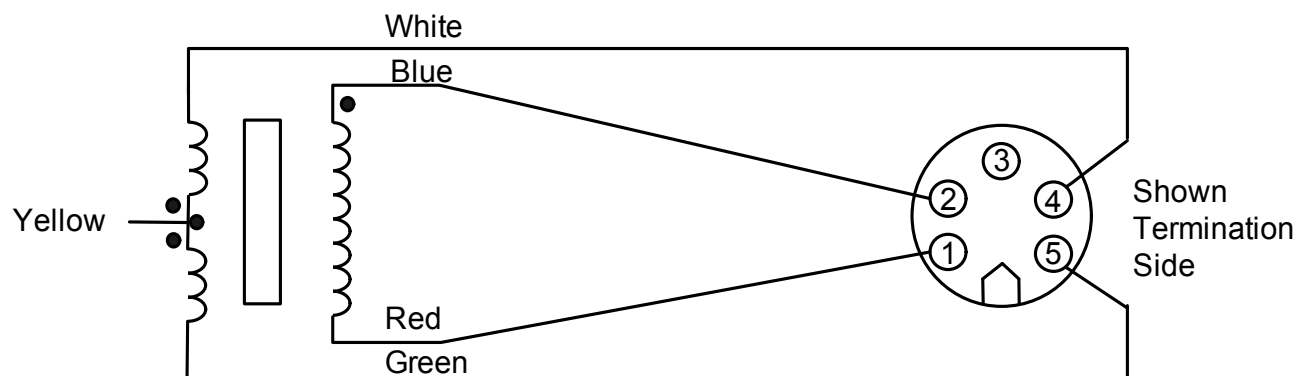
Figure 2 **Electrical Connections**

Connect Blue to Green or Black to Red for differential output.

Calibrated frequency,	voltage	load
5 kHz	3 volts rms	100 kΩ

White and Red are in phase for forward displacement (toward cable end).

Note: Fit "Quad Balance" resistor if supplied, between Red/Blue or Black/Green, as directed, in order to optimise linearity around null.



No responsibility is accepted for damage when accessories are fitted by the Customer.
 In the event of further information being required please contact your representative.

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 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 in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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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.

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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.

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