



Solartron  
Metrology

## GAUGING TRANSDUCERS



user leaflet

**METEK**<sup>®</sup>  
ULTRA PRECISION TECHNOLOGIES

# Product Description

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Solartron Metrology Gauging Transducers are high precision measurement probes intended for all gauging 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. gauging 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 affect the geometry of the installation.

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Where single point screw clamping is adopted then the tightening torque employed should be limited to that which will give a maximum of 50 Kg point load.

The typical maximum torque for an M5 x 0.8 mm or a 10-32 UNF screw would be approximately 0.27 Nm.

## **Tip Tightness**

Standard measuring tips are factory tightened to a torque of between 0.18 Nm and 0.22 Nm, 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 gauge master, zeroing any electrical offset control, selecting the coarsest gain and moving the gauging 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 Solartron probe used over the whole of its rated stroke should be mechanically set to within 0.10 mm 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.

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## **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 minimise 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 150 mm 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 50-75 mm from the end cap.

All non-pneumatic probes with the exception of the AX/0.5/S and A6G, are provided with a cable strain relief spring as standard (the AX/0.5/S and A6G may be provided with strain relief as a standard option). This feature allows the user to retrospectively install a right angle cable outlet to aid space or cable routing restrictions.

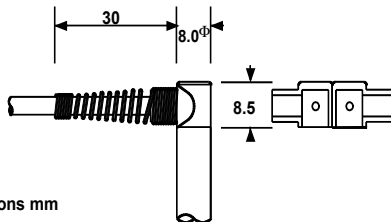
# Product Description

## Pneumatic Option (AX//P & AT//P Series)

The gauging 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. To maximise the working life of the probes the air supply should be both clean and dry; i.e. filtered to better than 5 microns and with a relative humidity of less than 60 %.

**AX//P** - The pneumatic probes are designed to be leak free and of small volume to minimise 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 9.5 mm dia. hole is desirable.

Operating Pressure Range for Standard AX//P Products :  
0.4 Bar (5.8 psi) to 1.0 Bar (14.5 psi)



# Product Description

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**AT//P** - AT//P series pneumatic probes are designed to operate pneumatically without the need for a rubber gaiter, the benefits derived over the AX//P series are a greater range of air pressure, and hence tip force, and are less susceptible to failure due to mechanical damage.

The features that must be considered when applying AT//P probes is that air loss through the probe can by specification, be up to 150 ml/min; and the exposed portion of the probe shaft cannot be allowed to become contaminated by viscous substance.

Operating Pressure Range for Standard AT//P Products: 0.3 Bar (4.4 psi) to 2.0 Bar (29 psi).

## **Vacuum Option (AX//V Series)**

The gauging 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

# Product Description

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## **Adjustable Pretravel Option (AX//S & AT//S Series)**

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

Pretravel should only be adjusted using the spanner provided.

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 gauging probes are specified to operate from -10 °C to +80 °C and all pneumatic probes from +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. Solartron Metrology probes are designed to withstand the rigors of in-process gauging and will operate satisfactorily in the presence of copious amounts of coolants and cleaning solvents.

# Product Description

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## **Quadrature Resistor**

These are supplied, where necessary, to minimise 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).

## **Electrical Connections for Standard Solartron Probes**

- Connector : Lumberg 5 pin 240° DIN

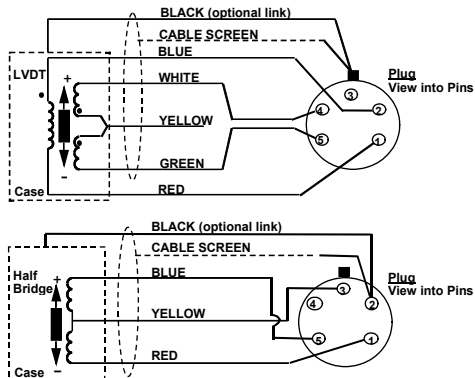


# Product Description

## Electrostatic Screen

The black wire link is provided as an optional ground connection to the body of the probe and can prove beneficial when connected to the instrument ground in providing electrostatic screening, particularly in hand held single point fixture applications.

Care must be taken in multi-point fixturing that multiple ground loops are not introduced and also that the black wire is not the sole ground connection for fixtures incorporating any mains operated components.



# W-Series Application Notes

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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  $\mu\text{m}$ .
- 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 Solartron 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.