



Solartron  
Metrology



## DIGITAL PROBE AND LINEAR ENCODER AND AGM



orbit3

orbitACS

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

# 1.0: Index

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Return Of Goods  
Solartron Sales Offices

For drawings please contact [sales.solartronmetrology@ametek.com](mailto:sales.solartronmetrology@ametek.com)

## 2.0: Safety Summary

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### Terms in this Handbook

**WARNING** statements identify conditions or practices that could result in personal injury or loss of life.

**CAUTION** statements identify conditions or practices that could result in damage to the equipment or other property.



### Symbols in this manual

This symbol indicates where applicable cautionary or other information is to be found.

### WARNINGS:

#### **Do not operate in an explosive atmosphere**

To avoid explosion, do not operate this equipment in an explosive atmosphere.

#### **Air Supply**

On LE/12/P and LE/25/P under no circumstances should a pressure of 1.0 bar be exceeded. Maximum humidity 60% RH filtered to 0.1 micron particle size.

### See separate AGM section for advice on AGM

### NOTES:

#### **This equipment contains no user serviceable parts**

This equipment must be returned to your Solartron dealer for all servicing and repair.

#### **Low Voltage**

This equipment operates at below the SELV and is therefore outside the scope of the Low Voltage Directive.

# 3.0: Introduction Digital Probe, Linear Encoder, AGM and Orbit® ACS

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The Digital Probe is available as two product types: Orbit®3 Module and the Orbit® ACS Module.

The Linear Encoder and AGM are available only as an Orbit®3 Module.

The probe and encoder are factory calibrated using a laser interferometer, the calibration data is then stored in the Orbit Module.

The Orbit®3 Digital Probe, AGM and Linear Encoder can be combined with other Orbit® Products to form a fully comprehensive Orbit® Measurement System. - See Orbit®3 System Manual.

Orbit® ACS Modules feature a local display which shows probe readings and allow the configuration of the ACS module's I/O. Its Modbus interface can be used to connect easily to PLC systems.

Orbit®ACS SI200 Modules can be connected to a second Orbit®3 probe to form a dual channel system.

Specifications of Orbit products including performance and dimensional data, software, drivers and program examples can be found on the Solartron website at:

[www.solartronmetrology.com](http://www.solartronmetrology.com)

[www.solartronmetrology.com/software](http://www.solartronmetrology.com/software)

For Orbit® ACS products please visit:

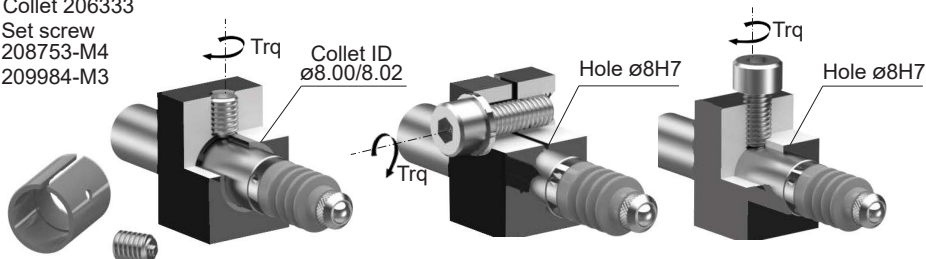
[www.solartronmetrology.com/ACS](http://www.solartronmetrology.com/ACS)

## 4.0: Probe Mounting Information

Diagrams showing probe clamping method in order of preference. In all cases when clamping over the bearing area it is practical to tighten clamp screws gradually whilst actuating probe tip to the point where the smooth motion degrades then back off screw until motion returns to smooth - ensure probe is secure

Collet 206333

Set screw  
208753-M4  
209984-M3



Method 1:

Typical Clamping Torque  
M4 Screw : 0.30/0.35 Nm  
M5 Screw : 0.35/0.40 Nm

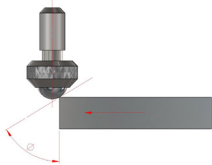
### 4.1 Gaiter Clearance

Maintain operational clearance of a  $\varnothing 9.5$  mm hole around the gaiter.

# 4.0: Probe Mounting Information

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## 4.2 Tip



Note:

- 1) Care should be taken when a part is entered sideways under a probe, especially when using a spring push. The maximum contact angle should be limited to 45° to avoid applying excessive sideloads.
- 2) When removing or replacing tips on digital probes, displace shaft to the fully in position before applying torque.

## 4.3 Pneumatic Probes

**DO NOT OVER CLAMP** - Over clamping will restrict the shaft movement. For best results when setting up, apply air to probe if required, tighten clamp until stroke just begins to feel restricted. Release the clamping mechanism slightly to gain correct movement.

Spring Push Versions - Same principles apply without connection to air.

Air pressure may be varied within the specified limits (see catalogue) to achieve the desired tip force.

Pneumatic Probes Type DP/x/P and LE/x/P are designed to be leak free, the gaiter provides the actuation and must not be damaged - otherwise actuation will fail.

## 4.0: Probe Mounting Information

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Pneumatic Probes Type DJ/x/P are designed to leak a small amount of air via a vent hole this must be kept clear of obstruction. The gaiter provides protection against ingress of dirt only. The probe will remain operational with a damaged gaiter, but the integrity of the probe will be compromised.

Feather Touch Pneumatic Probes Type DT/x/P are designed to leak a small amount of air around the shaft/shroud interface. DT probes should be used in a clean environment.

To maximize the probe life, the air supply should be clean and dry. Maximum relative humidity is 60% RH. Filtered to better than 5  $\mu\text{m}$  particle size (0.1  $\mu\text{m}$  for LE products).

Clamping position  
for D3P/1/S only

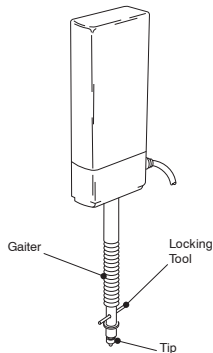


# 5.0: Handling & Maintenance

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## Replacing the probe tip - LE

1. Slide back gaiter (fitted to IP65 and pneumatic versions only) to reveal the hole in the shaft.
2. Insert locking tool (supplied) in the hole.
3. Unscrew tip while holding locking tool to prevent any damage to the read head.
4. Install new tip while holding locking tool.
5. Hand tighten tip.
6. Slide down gaiter, (IP65 and pneumatic versions only).



## DT/30/P Bearing Maintenance

The DT/30/P uses a precision plain bearing. To maintain optimum performance, it is recommended that the bearing is lightly lubricated with a mineral watch oil after every 3 million cycles; typically Moebius Synta Frigo Lube 9030.

Apply a single drop to the extended shaft and wipe with a lint free cloth.



# 6.0: W-Series Application Notes

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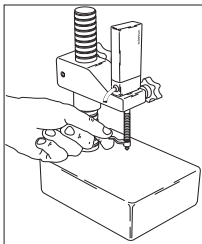
When applying these probes the following pertinent points need to be observed in order to maintain the specification and to maintain continued reliable operation:

- 1) Air supply must be clean and dry, ie. Max 60% RH and filtered to particle size of 0.1 mm.
- 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) It is not recommended that the W-Series probes are subjected to side loading, as this can considerably shorten the useful working life.

# 7.0: Linear Encoder Operation

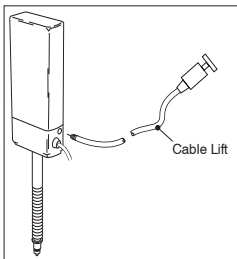
## Finger Lift

Snaps over probe tip enabling tip to be lifted consistently and without transferring heat to the shaft.



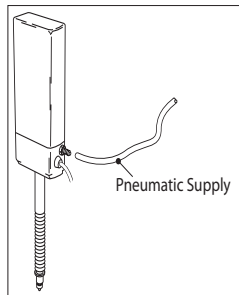
## Cable Lift

Allows tip to be retracted without touching Linear Encoder. Cable retract screws into probe body after removal of blanking screw.



## Pneumatic Operation

A Pneumatic nozzle is fitted as standard to LE/12/P & LE/25/P. By applying air between 0.5 & 0.8 bar, the measuring tip will extend to meet component under test. On no account should a pressure exceeding 1.0 bar be applied.



## WARNING:

Damage/injury could be caused if the maximum recommended air pressure is exceeded.



## CAUTION

Ensure that air supply for pneumatic operation is clean, dry and oil free.

# 8.0: Orbit3 and Orbit ACS Digital Probe with Connector Operation Notes

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Connect the probe connector to the module until it clicks into place. When fitting a probe to a module with power already on, cycling the module's power is required for it to read the new probe's calibration data.

For Orbit3 DPs, the module Identity, not the probe's, will be used when communicating via Orbit. For example, when notifying a DP with connector, the module Orbit Identity is returned.

When connecting a different, compatible probe to a module, re-mastering / re-zeroing is recommended before use.

When connecting a probe to a module, the probe must be compatible with the module (same base part number). For example, a DP10 part with in line connector: 971110-3P requires a PIE Module with connector type 971110-\*\*\*, in order to be compatible. Where \*\*\* defines the module configuration.

# 8.0: Orbit3 and Orbit ACS Digital Probe with Connector Operation Notes

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If an incompatible probe (for example a DP2 probe is connected to a DP10 module) is detected:

- Orbit3 DPs – the red LED will be lit to indicate a hardware fault. An error code is set in the module.
- Orbit ACS – “Range Error” is displayed (for already set-up modules). It is not possible to notify (set-up) a module with an incompatible probe error condition.

Reconnecting a compatible probe and powering the system off and on will clear the fault.

If the module detects the probe is missing (either on power-up or during operation),

- Orbit3 DPs – the red LED will be lit to indicate a hardware fault. An error code is set in the module.
- Orbit ACS – “Range Error” is displayed (for already set-up modules).

Reconnecting the probe and powering the system off and on will clear the fault

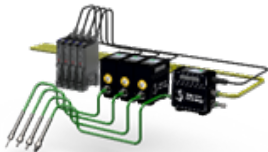
# 9.0: Orbit AIR Gauge Module (AGM) - All Types

## Safety

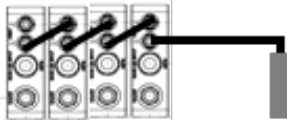
The AGM and associated Air Gauging heads use compressed air and are for industrial use only by competent personnel. The air supply must be dry and filtered to prevent ingress of contamination into the AGM. Ensure that you comply with the relevant regulations for use of compressed air for the location where the AGM is installed. The maximum operating pressure is 30 psi.

## Connections

The Type A Module (with integrated display) connects to a conventional Orbit TCON using the supplied PIE module. (Below)



The Type B Modules can be linked together using the connectors on the end of the module. The final connection being made using the Orbit Interface Module accessory. Up to 20 AGM Type B's can be linked to one Orbit Interface Module. (Below)



The Type A Module (with integrated display) connects to a conventional Orbit TCON using the supplied PIE module.

# 10.0: Environmental Consideration

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Probes are best used with gaiters for protection, this prevents most ingress of fluids and contamination. For probes without gaiters then the working environment must be clean and dry. It is the user's responsibility to ensure that the application is suitable for the probe type selected. It is not advisable to use the probe close to processes that generate swarf and contamination without considering additional protection, where possible, of the gaiter and cable.