

# orbit 3

DIGITAL NETWORK



Solartron Metrology is part of AMETEK, a leading global manufacturer of electronic instruments and electric motors with annual sales of more than \$2.1 billion. AMETEK Inc has approximately 10,000 employees at plants and operations in the United States and 30 other countries.

## World leaders in linear measurement...



Solartron Metrology is a world leader in the innovation and manufacture of precision digital and analogue dimensional gauging probes, displacement transducers, optical linear encoders and associated instrumentation.

Headquartered in the UK, with sales offices in the Americas, Europe and Asia, and distributors in over 30 countries worldwide, around 90% of our production is exported.

In the lab, on the shop floor or in the field, Solartron Metrology products provide precise linear measurements for quality control, test and measurement and machine control, in for example, the automotive, electronics, aerospace, materials, optics and semiconductor industries... anywhere, in fact where accuracy and consistency are critical to the process.

The inherent reliability of Solartron Metrology measurement technologies reduces the cost of ownership, a big factor for many users.

As mechanical components become smaller and more intricate, the accuracy of their manufacture is an increasingly complex challenge. Our latest smaller, more adaptable gauging products, including flexure, lever, mini probes and block gauges are designed to address these problems. We also have a new range of displacement transducers, the S Series, engineered to interface with modern data acquisition and control systems.

The inherent simplicity and flexibility of the company's Orbit digital network system makes it the perfect platform for all these new measuring devices.

Rest assured that wherever you are, whatever your application, we have the technology, the commitment and the resources to help you make it better.



## Over six decades of continuous innovation...

**1946** Solartron Metrology's origins began with a UK company, Faroll Research, which developed the Weissenberg Rheogoniometer. Included in this instrument was a Linear Variable Differential Transducer (LVDT). This was the beginning of Solartron's involvement with inductive transducers.

**1965** Faroll Research was sold to Sangamo Weston Ltd and became known as Sangamo Weston Controls Ltd.

**1976** The company, acquired by Schlumberger and renamed Sangamo Transducers, developed a range of high performance signal conditioning and data acquisition systems.

**1979** Sangamo Transducers produced its first Gauging Transducers based on LVDT and Half Bridge technologies and incorporating a precision linear bearing.

**1985** Sangamo Transducers became known as Schlumberger Industries Transducer Division and became the world leader in their field with products being sold throughout the world.

**1993** Following a management buyout the name of the company changed again to Solartron Metrology, before becoming part of the Roxboro Group PLC.

**1994** Solartron Metrology developed its revolutionary Digital Gauging Probe and the Orbit® Digital Network System

**2006** Solartron Metrology was acquired by AMETEK, a leading global manufacturer of electronic instruments and electric motors.

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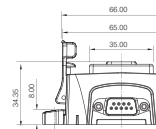
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# Orbit digital measurement system



**Higher performance does not mean higher costs.**

Quality standards in industry and research are becoming increasingly tight and demands for cost savings are also increasing. The upgrade from Orbit 2 to Orbit 3 provides the way forward for present and future precision measurement or positioning needs, whether on the production line or in the laboratory.

A system that incorporates more than one sensor technology will normally require different sets of signal conditioning electronics and software, with all the problems often associated with getting diverse technologies and software to work together.

In recognition to the fact that there is not a single sensor technology that is suitable for all gauging or positioning applications, Orbit 3 is not dedicated to a single sensor technology and is designed for use with an extensive range of third party sensors.

The upgrade to the Orbit 3 system carries forward all the well proven attributes of Orbit 2 plus essential additions to performance at no extra cost. (See page 7)

Orbit 3 is still based on a rugged and well proven RS485 multi-drop network running at 1.5m Baud. This enables the very high data speeds required for dynamic applications. Special attention has been given to all aspects of screening against electrical interference to provide good noise immunity (conforms to EN61000-6-2), which is essential to ensure reliable data processing.

All Solartron Metrology sensors and mechanical interfaces have been rigorously tested to ensure a long and productive life which coupled with the Orbit 3 data processing system leads to less down time, improved productivity and lower cost of ownership.

**Software**

Solartron Metrology provides support software for Microsoft Windows. This includes a COM object library and DLLs. These allow interfaces with modern development environments. Examples are also available in VBA.

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Orbit® is a registered trademark of Solartron Metrology.

Controllers	No. of devices	Description
SI 1500	1	Single channel panel mount display
SI 3500	2	Twin axis display / controller
DR 600 / DR 700	Up to 30	Digital readout
SI 7500	Up to 16	Multi channel controller
RS232 Interface Module	Up to 100	Single channel serial interface
USB Interface Module	Up to 31	Single channel serial interface
Ethernet Interface Module	TBC	Single channel serial interface
PCI network card	Up to 200 in standard mode	Dual channel PCI card (up to 100 devices per channel)

Refer to page 14 for details

Interface Modules	Description
Encoder Input	Interface to rotary and linear scale incremental encoders (TTL)
Digital I/O	Interface to discrete switches and to provide switch outputs. 8 I/O lines
Analogue Input	Interface to physical sensors with a DC output or 4-20mA
Digimatic Input	Interface to Digimatic capable gauges
Power Supply (not shown)	Provides power to Orbit modules

Refer to page 15 for details



# A universal truth

Data is only of true value when it is processed from a reliable source



Machined from solid, hardened stainless steel (400 series)

All standard transducer cables feature a polyurethane (PUR) sheath with a foil screen layer for better electrical screening. Improved mechanical properties include reduced 'memory' effect and superior resistance to scuffs and cuts

Titanium core carrier: inert and able to withstand lateral shock

A multi-chambered coil helps improve efficiency by increasing the gain as the core moves along the coil

Tight tolerance cartridge type bearing with carbon/chrome balls provides good non repeat and long life (type tested to over 13m cycles)

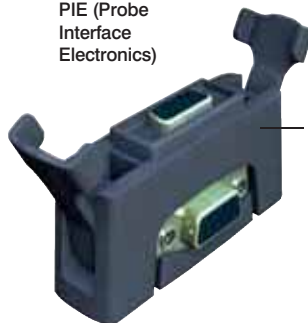
Anti rotation device designed to be strong yet give good non repeat with probe tip off centre

Indicator lamps show power within limits and data transmission active



Strong light weight body with screening against electrical interference to EN61000-6-2

PIE (Probe Interface Electronics)



Strong lightweight construction holding the sensor address to enable HOT SWAP facility. Improved clamping and IP65 option

T-Con Orbit network connector



35mm DIN Rail mount as standard. Removeable to enable alternative mounting options.



## Unerring data collection

A reliable sensor is essential to any data processing system. All Solartron Orbit based digital sensors and mechanical interfaces are designed to generate reliable data, not just from new but for millions of cycles.

## Powerful processing

Good original data can be ruined by noisy signal conditioning and poor immunity to electrical interference, which in turn affects the repeatability of results. Orbit 3 processes and transmits clean, repeatable data from sensors at speeds of up to 4,000 readings per second.

## Rock solid results

Data is only of use if it can be displayed and/or acted upon. Orbit 3 is available with a comprehensive range of Display/Controllers or software drivers and DLL's for PC based systems. Ethernet modules will be added to the existing PCI card, I/O and RS 232 modules during 2010 to increase communication options to both PC's and PLC's.

Unerring data collection + Powerful processing = Rock solid results

# orbit 2 v orbit 3

It just gets better and better...



## Specification/feature

### orbit 2

### orbit 3

Accuracy	0.1% of reading	0.05% to 0.07% of reading (depending on probe type)
Hot Swap Capability	N/A	Smart T-Con enables fast exchange of probes
Modules into single PCI card <sup>1</sup>	62	200
Probe Fault Indication	Happy Light	Each PIE / Sensor (Red)
Low Supply Voltage Indication	N/A	Each PIE / Sensor (Red)
Data Transmission Indication	Happy Light	Each PIE / Sensor (Blue)
Weight	128g	88g max( Din Rail option)
Environmental Sealing (PIE / T-Con)	IP43	IP43 / IP65 Optional
Din Rail Mount option	N/A	New T-Con design with DIN Rail (35mm) attachment
Ethernet Interface Module	N/A	Ethernet Communication Module to be available 2010
RS232 Interface Module	31 modules	Improved to handle 100 modules
Encoder Input Module	Standard / Dynamic	As orbit2 + Dynamic Measurement Control
Clamping Arrangements	Single Lever Mechanism	Increased robustness of clamping assembly using double-lever assembly for high vibration applications
Power Supply Modules	Separate Block Arrangement	New smaller versions including PIE DC voltage version connected directly to stack
Compatibility with Instruments	Solartron SI 1500, SI 3500, SI 7500, DR 600, DR 700	
Measurement Ranges	1, 2, 5, 10, 20mm for Gauging sensors, 1mm to 300mm for Displacement sensors	
Actuation	Spring, Pneumatic, Feather Touch, Ultra-Feathertouch	
Measurement Modes	Standard, Dynamic, Buffered	Standard, Dynamic, Buffered (included as standard)
Resolution	User selectable <0.1µm	
Mechanical Construction of Electronics Modules	Die-cast Aluminium	Nylon and ABS plastic
Electrical Immunity <sup>2</sup>	CE Marked	CE Marked
Operating Temperature (PIE / T-Con)	0° to +60°C	0° to +60°C
Electrical / Software Compatibility	Orbit 3 is completely electrically compatible with Orbit 2 and software	
Mechanical Compatibility	Orbit 3 is mechanically compatible with Orbit 2 when mounted at the start or end of the Orbit 2 stack	

<sup>1</sup> External power supplies required for >10 modules

<sup>2</sup> EN6100-6-3 and EN6100-6-2 (2005)

**Contact Gauging probes very often provide the only cost effective solution for a wide range of measuring or positioning applications in diverse industries.**

As with all electromechanical transducers, life is of paramount importance. It is not too difficult to produce a Gauge Probe that performs well when new, it is considerably more difficult to produce a probe that maintains its performance throughout a long working life.

It requires close attention to detail in design and materials as well as considerable investment in state of the art machines to produce bearings, which are the heart of a gauge probe.

Solartron Metrology has complete control in house over all aspects for the design and manufacture of a wide range of linear bearing assemblies and sensors.

This is demonstrated very well in the DZ range, where a very short body length and increased performance has been made possible due to a unique sensor being mounted inside a special bearing.

Whether the application is in the laboratory or in a manufacturing environment, Solartron Metrology's extensive range of gauge probes has something suitable for a very wide range of environments.

Customised or special products will always be considered when there is not an exact fit in our standard product range.



## Standard - DP

The Standard DP range of Spring Push Probes has justifiably become the workhorse of the gauging industry. Very high resolution, excellent linearity and high data speed come as standard. Long life precision bearings, and an IP65 rating ensure that probes maintain their performance for millions of cycles.



## Feather Touch - DT

With very low tip forces coupled with user selectable options of high resolution and data speed, Feather Touch Probes are ideal for the gauging of delicate high precision components. Long life bearings ensure that the performance of the probes are maintained through millions of cycles in industries producing high volumes of components on short cycle times.



## Compact - DZ

The DZ's are probably the shortest probes available on the market with a full 1mm or 2mm calibrated travel. A bearing size normally found only in much longer bodies ensures a long life. The small size coupled to enhanced linearity and resolution make them ideal where space is a problem.

	Short or Narrow Body					Standard				
Axial cable outlet	DZ/1/S	DZ/2/S	-	DP/1/S	D6P/2/S	DP/2/S	DP/5/S	DP/10/S	DP/20/S	DP10/2/S
Radial cable outlet	DZR/1/S	DZR/2/S	DP/0.5/S	-	-	DPR/2/S	-	DPR/10/S	DPR/20/S	-
Body diameter	8h6				6h6	8h6				
Measurement range (mm)	1	2	0.5	1	2	2	5	10	20	2
Pre-travel (mm)	0.15	0.15	0.03	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Over travel (mm)	0.35	0.35	0.05	0.35	0.35	0.85	0.85	0.85	0.85	8.85
Accuracy (% of reading) <sup>1</sup>	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.05
Repeatability (μm)	0.15	0.15	0.1	0.15	0.15	<0.15				
Tip Force (N) @ centre travel	0.7 ± 20%					0.7 ± 20%				
Resolution (μm user selectable)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.1	<0.01
Data speed (user selectable)	Up to 3906 readings per second					Up to 3906 readings per second				
Environmental Protection	IP65 (Probe only)					IP65 (Probe only)				

	Feather Touch				
Axial cable outlet	DT/2/S	DT/5/S	DT/10/S	DT/20/S	DT10/2/S
Radial cable outlet	DTR/2/S	DTR/5/S	DTR/10/S	DTR/20/S	-
Body diameter	8h6				
Measurement range (mm)	2	5	10	20	2
Pre-travel (mm)	0.15	0.15	0.15	0.15	
Over travel (mm)	0.85	0.85	0.85	0.85	8.85
Accuracy (% of reading) <sup>1</sup>	0.05	0.05	0.06	0.07	0.05
Repeatability (μm)	<0.15				
Tip Force (N) @ centre travel	0.3 ± 20%				
Resolution (μm user selectable)	<0.01	<0.05	<0.05	<0.1	<0.01
Data speed (user selectable)	Up to 3906 readings per second				
Environmental Protection	IP50 (probe only)				

Temperature ranges (°C)	
Storage: probe + signal conditioning	-20 to +70
Operating: PIE / T-Con	0 to 60
Probe operating: (not Feather Touch)	+5 to +80
Probe operating: (Feather Touch)	-10 to +80

Materials	
Case	Stainless steel
Probe tip	Nylon or tungsten carbide
Gaiter	High grade polymer (none on Feather Touch)
Cable	2m PUR



Braided and armoured cable and special cable lengths are available on request

<sup>1</sup> Accuracy 1μm or % reading, whichever greater

Digital Probe interface electronics		
Bandwidth	Up to 460Hz	
Output	Serial RS485 signal level, Solartron Orbit Protocol	
Power ( VDC )	5 ± 0.25@0.06A, includes power for probe	
IP Rating	43 ( 65 available on request )	
Weight (grams)	Probe interface electronics	52
	T connector	36
	DIN rail adaptor + T-Con	46

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# Gauge probes: pneumatic push

Pneumatic Probes are ideal for use in automatic gauging applications or for accessing details that would be difficult or impossible to reach using conventional spring push probes.

With no side loading at the contact tip, Pneumatic probes also ensure excellent repeatability and long life.

Various component materials and designs are affected in different ways by the force applied at the point of contact at the probe tip. Some materials such as glass or plastic, for example, require very low tip forces to avoid deforming the component and contact tip materials that do not leave a mark. Other applications may require higher tip forces.



## Standard range - DP

The Standard range of Pneumatic Probes comes with an IP65 rating to ensure a long working life in wet or oily environments.

In order to ensure the probe is totally sealed to IP65, actuation is achieved by pressurising the gaiter.



## 'J' Type - DJ

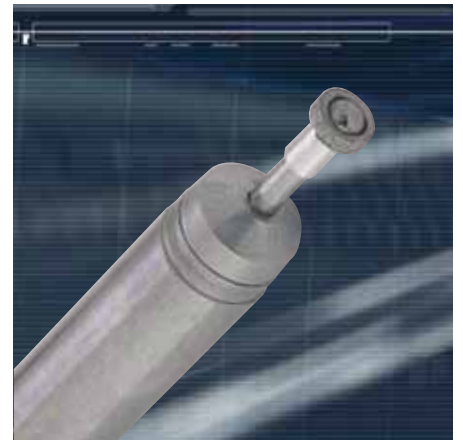
J' Type probes are similar to Standard Pneumatic Probes except that actuation is by an inbuilt piston. High tip forces are available but as air is vented through a port close to the front of the probe, they have a lower IP rating.



## Feather Touch - DT

Feather Touch Probes are designed specifically for applications where low tip forces are critical.

Air is vented through the shroud at the front of the probe during actuation, which in turn cleans the bearing. With no gaiter to protect the shaft from contamination they are unsuitable for use in wet or oily conditions.



## Ultra Feather Touch - UT

Ultra Light probes are similar to Feather Touch probes except they have a significantly lower moving mass and are capable of tip forces as low as 0.03N.

	Standard					'J' Type					
	DP/2/P	DP/5/P	DP/10/P	DP/20/P	DP10/2P	D6J/2/P	DJ/2/P	DJ/5/P	DJ/10/P	DJ10/2P	
Axial cable outlet	DP/2/P	DP/5/P	DP/10/P	DP/20/P	DP10/2P	D6J/2/P	DJ/2/P	DJ/5/P	DJ/10/P	DJ10/2P	
Radial cable outlet	DPR/2/P	DPR/5/P	DPR/10/P	DP/20/P	DPR10/2P	-	DJR/2/P	DJR/5/P	DJR/10/P	DJR10/2P	
Body diameter	8h6					6H6	8h6				
Measurement range (mm)	2	5	10	20	2	2	2	5	10	2	
Pre-travel (mm)	0.15					0.15	0.15	0.15	0.15	0.15	
Over travel (mm)	0.85	0.85			8.85	0.35	0.85			8.85	
Accuracy (% of reading) <sup>1</sup>	0.05	0.05	0.06	0.07	0.05	0.05	0.05	0.05	0.06	0.06	
Repeatability (µm)	0.15					0.15					
Tip Force (N) @ centre travel ± 20%	0.8 @ 0.4 Bar, 2.8 @ 1 Bar	0.85 @ 0.4 Bar, 2.8 @ 1 Bar	0.7 @ 0.4 Bar, 2.5 @ 1 Bar			1.15@1bar	0.85 @ 1Bar ± 20%				
Resolution (µm user selectable)	<0.01	<0.05	<0.05	<0.1	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	
Data speed (user selectable)	Up to 3906 readings per second					Up to 3906 readings per second					
Environmental Protection	IP65 (probe only)					IP50 (probe only)					

	Feather Touch				Ultra Feather Touch	
	DT/2/P	DT/5/P	DT/10/P	DT/20P		
Axial cable outlet	DT/2/P	DT/5/P	DT/10/P	DT/20P	Ultra Feather Touch	
Radial cable outlet	DTR/2/P	DTR/5/P	DTR/10/P	DTR/20/P		
Body diameter	8h6					8h6
Measurement range (mm)	2	5	10	20		10
Pre-travel (mm)	0.15					0.15
Over travel (mm)	0.85					0.85
Accuracy (% of reading) <sup>1</sup>	0.05	0.05	0.06	0.07		0.06
Repeatability (µm)	0.15					0.15
Tip Force (N) @ centre travel	0.18 @ 0.3 Bar, 1.1 @ 1 Bar ± 30%					0.03 - 0.05 @ 0.4 bar
Resolution (µm user selectable)	<0.01	<0.05	<0.05	<0.1		<0.01
Data speed (user selectable)	Up to 3906 readings per second					
Environmental Protection	IP50 (probe only)					

Temperature ranges (°C)	
Storage: probe + signal conditioning	-20 to +70
Operating: PIE / T-Con	0 to 60
Probe operating: (not Feather Touch)	+5 to +80
Probe Operating: (Feather Touch)	-10 to +80

Materials	
Case	Stainless steel
Probe tip	Nylon or tungsten carbide
Gaiter	High grade polymer (none on Feather Touch)
Cable	2m PUR



Braided and armoured cable and special cable lengths are available on request

<sup>1</sup> Accuracy 1µm or % reading, whichever greater

Digital Probe interface electronics		
Bandwidth	Up to 460Hz	
Output	Serial RS485signal level, Solartron Orbit Protocol	
Power ( VDC )	5± 0.25@0.06A, includes power for probe	
IP Rating	43 ( 65 available on request )	
Weight (grams)	Probe interface electronics	52
	T connector	36
	DIN rail adaptor + T-Con	46

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**Solartron's specialist gauging products are for applications where a standard pencil style probe for various reasons won't fit.**

They are primarily motion changers or mechanical interfaces that sit between the component and measuring sensor.

Special care has to be applied in the design and manufacture of all mechanical interfaces where the contact point is not in line with or may be some distance from the sensor.

Unmeasured movement that is often seen for example in classic bell arm lever type motion changers, is a major cause of poor gauge R&R. All Solartron specialist gauging products are specifically designed to ensure long life and consistent repeatability.

Block Gauges have precision linear bearings with zero clearance which limits unmeasured movement and therefore maintains good repeatability, even when the contact tip is mounted off centre.

Flexures have no sliding components within the gauge frame and no contacting moving components within the sensor. This means that millions of cycles are achievable without degradation of performance.

The miniature flexures within Mini Probes are particularly robust on both axes of loading.



### Block gauge - DK

Block Gauges make precision measurements of bores and cavities a simple and reliable process. A range of springs is available to ensure that tip forces can be maintained with the Block gauge mounted in any attitude. Pneumatic actuators can be retrofitted for automatic applications.



### Flexure - DU

Flexures are ideal for very high volume and high precision applications such as bearing component gauging. They are often the best solution for measuring moving material, such as roundness testing, with Orbit set to very high resolution and fast data transmission.



### Mini probe - DM

The Mini Probe is a very robust miniature flexure with all the attributes of its bigger brother. It's particularly useful in all aspects of bore gauging where high accuracy and durability are required. A range of customer fit contact tips are available to suit most gauging applications.



### Lever probe - DL

Lever probes are generally used for precision gauging of components, such as shafts, for profiling but the Orbit compatible Lever Probe is not restricted to such applications. The narrow body (compared to such devices based on dial test indicators) coupled with a gentle touch down to 0.05N enables access to difficult to reach details, even on fragile components.

Block Gauge			
Axial cable outlet	DK/2	DK/5	DK/10
Radial cable outlet	DKR/2	DKR/5	DKR/10
Measurement range (mm)	2	5	10
Total mechanical travel (mm)	3	6	11
Accuracy (% of reading) <sup>1</sup>	0.05	0.05	0.08
Repeatability (μm) @0.7 N tip force	0.25	0.25	0.5
Tip force (N) at centre of travel (horiz. attitude) ±20%	1.5	1.5	1.5
Mass of moving parts (g) less tool holder	35	90	95
Temperature coefficient (μm/°C)	±0.2	±0.5	±1.0
Environmental protection	IP65		

Tip force is affected by mounting attitude and weight of accessories. Tip force can be adjusted higher or lower using a selection of springs. Tip force depends on the weight of accessories + the selected springs + air pressure. See page 28 for tool and tip holders, springs and pneumatic actuators.

Mini Probe	DM/0.5/S		DM/1.0/S	
Measurement range (mm)	0.5		1	
Accuracy (% of reading) <sup>1</sup>	0.20		0.2	
Repeatability (μm)	on axis	cross axis	on axis	cross axis
...at 100μ from limit stop	0.1	0.1	0.1	0.1
...at 250μ from limit stop	0.25	0.15	-	-
...at 500μ from limit stop	0.5	0.25	0.15	0.1
...at 1000μ from limit stop	-	-	0.3	0.15
Tip force (at centre of range) (N)	0.7 ±25%			
Temperature coefficient (μm/°C)	0.08			
Tip adjustment (mm)	±0.25 from the factory position. Refer to manual			
Mounting	1x M3 hex head screw (supplied)			

<sup>1</sup> Accuracy 1μm or % reading, whichever greater

Digital Probe interface electronics	
Bandwidth	Up to 460Hz
Output	Serial RS485 signal level, Solartron Orbit Protocol
Power ( VDC )	5 ± 0.25@0.06A, includes power for probe
IP Rating	43 ( 65 available on request )
Weight (grams)	Probe interface electronics 52 T connector 36 DIN rail adaptor + connector 46

Flexure Gauge	
Axial cable outlet	DU/2/S
Radial cable outlet	DU/2/R
Measurement range (mm)	2
Total mechanical travel (mm)	2.5
Accuracy (% of reading) <sup>1</sup>	0.05
Repeatability (μm) @0.7 N tip force	0.1
Tip force (N) at centre of travel (horiz. attitude)	1.5
Environmental protection	IP65

Lever Probe	
Measurement range (mm)	0.5
Mechanical travel (mm)	0.6
Stylus adjustment	180°
Accuracy (% of reading) <sup>1</sup>	0.2
Repeatability (μm) (on axis)	<0.15
Hysteresis (μm)	<0.25
Tip force (N) in 0.05N increments	0.05 - 0.3
Temperature coefficient	0.1μm/°C

Temperature ranges (°C)	
Storage (all)	-20 to +70
Operating (all)	5 to 60

Materials	
Body / frame	Stainless steel (not mini probe)
Probe tip	various options
Gaiter	High grade polymer (not lever probe)
Cable	2m PUR (not mini probe - see P29)

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# Controllers



Whether it be PC, laptop or PLC, Solartron Metrology offers a range of plug-and-go interfaces for directly connecting an Orbit network to the controller of your choice.



Arriving 2010

	PCI Network card	USB Interface Module (USBIM)	RS232 Interface Module (RS232IM)	Ethernet Interface Module (ETHIM)
<b>Computer Interface</b>				
Bus	PCI	USB 2.0 full speed	RS232 (up to 115.2 kB)	Ethernet
Operating system	Microsoft Windows			
<b>Network Interface</b>				
Signal	RS485			
Protocol	Orbit			
Number of Orbit modules (with external PSIM) <sup>1</sup>	Up to 100	Up to 31	Up to 100	To be confirmed
Number of Orbit modules without external PSIM <sup>2</sup>	Up to 10 depending on module type	Up to 4 depending on module type	0	
Baud Rate	187.5kB or 1.5MB		187.5kB	
Measurement Modes supported <sup>3</sup>	All modes	Standard/Buffered		
<b>Power Requirement</b>				
Voltage Range (VDC)	4.7 to 5.25			To be confirmed
No Load Current (mA)	250	250	62	
<b>Environmental</b>				
Operating Temp. Range (°C)	0 to +60			To be confirmed
Storage Temp. Range (°C)	-20 to +85			
IP Rating	-	43		
<b>Mechanical &amp; Connections</b>				
Computer connections	PCI card slot	USB socket type A	RS232 port	Ethernet port
Dimensions (mm)	-	65 x 61 x 18 excluding connector (refer to PIE drawings on page 30)		
Weight (g)	89	98g max( Din Rail option)		
Material	-	Nylon and ABS plastic		

<sup>1</sup> 1 PSIM required per channel.

<sup>2</sup> The specifications quoted are dependant on the power available from the computer in use.

<sup>3</sup> Orbit provides three measurement modes. **Standard** where modules are communicated with on an individual basis. Each module is asked for its measurement data by the controller as required. **Buffered** where modules are told by the controller to take a series of measurements and store them in internal module memory. This data is then extracted in one block by the controller when the required measurements have been taken. **Dynamic** where modules take measurements on receipt of a common synchronization pulse sent to the modules from the controller. Each module in turn sends its data back to the controller within a specific time frame. This process continues until the required number of measurements have been taken.

Solartron also offers a range of modules for third party sensors and for general instrumentation tasks.

The Analogue Input Module integrates third party transducers (e.g. temperature, force, pressure) to the Orbit network. The Digital Input/ Output

module enables switches or control lines and the Encoder Input Module ties in rotary or line scale incremental type encoders (TTL).



	Digimatic input Module (DIM)	Analogue Input Module (AIM)	Encoder Input Module (EIM)	Digital input-output Module (DIOM)
<b>Power Requirement</b>				
Voltage Range (VDC)	5 ±0.25			
Current Consumption <sup>1</sup> (mA)	41	Up to 154 depending on input type	49	42 (no load)
<b>Signal Input <sup>2</sup></b>				
Input Type	Digimatic Interface	Analogue Voltage or Current	Incremental Encoder	8 channel Input/Output
Input Voltage (VDC)	-	0-24, 0-10, 0-5, ±10, ±5	30 max	0 to 30
Input Currents (mA)	-	4-20, ±20, 0-20	< 10	1 per Channel
Options	-	Special PT100 module available	Single ended or differential, HTL	-
<b>Signal Output</b>				
Voltage Output	-	-	-	Open drain up to 30 V
Current Output	-	-	-	50 mA for each output
Reading Speed	-	-	Up to 3906 readings/second	
Interpolation Rate	-	-	x1, x2, x4 programmable	-
<b>Measurements performance</b>				
Warm-up	-	95% accuracy after 5 mins	-	-
Linearity (%FSO)	-	0.05	-	-
Bandwidth	-	460 Hz	1.2 MHz max frequency	DC
Measurement Modes	Standard	Standard/Dynamic/Buffered	Standard/Dynamic	Standard/Dynamic
<b>Environmental</b>				
Operating Temp. Range (°C)	0 to +60			
Storage Temp. Range (°C)	-20 to +85			
IP Rating	43			
<b>Mechanical &amp; Connections</b>				
Transducer	Various connector options			
Enclosure - Size (mm)	65 x 61 x 18 excluding connector (refer to PIE drawings on page 30)			
Weight (g)	160			
Material	Nylon and ABS plastic			

1 Excludes sensor consumption. 2 Transducer interface.

## PSIM (Power Supply Interface Module)

For use with multi-channel systems needing more power than available from the host computer. The power supply can also extend the network beyond the normal 10m per port limit depending on cable type.

### PSIM Transformer (not shown)

For use with Power Supply Interface Module versions PSIM-AC.

Other accessories available include high performance data cables to ensure high speed orbit communication.

	PSIM-AC	PSIM-DC	PSIM-5V
Output voltage	5.1VDC @ 1.8A max.		
Operating temp. range (°C)	0 to +60		
Drive capability	Up to 31 Orbit modules dependent on type		
Supply voltage	90 to 264VAC @ 1 A max.	10 to 30VDC	0 to 30
Supply frequency (Hz)	47 to 440	-	-
Termination	IEC320 plug (supplied with 2m lead and local AC supply connector)	2m flying lead	5m flying lead (input directly to the module. There is no transformer)
Cable length (m)	2 (between module and power supply)		-
Dimensions	As PIE plus T-CON (see page 30). Module does not separate		

PSIM dimensions are identical to PIE plus T-Con, however the unit does not separate



## PIE (Probe Interface Electronics)

Fitted to all Orbit products

## T-Con connector

The Orbit Network 'building block'

## 35mm DIN rail connector

Supplied as standard

### Also see...

Dimensions and drawings

Page 30

## Orbit® support pack for Windows®

Solartron Metrology provides software support for Microsoft Windows. This software is supplied with the Orbit Network Card, the USB Interface Module and the RS232 Interface Module.

The Orbit Windows Support Pack software includes a COM Object Library for COM applications and Dynamic Link Libraries (DLLs) for lower level programming. Support is also provided for all major programming languages, such as VBA, VB, C++, Borland C Builder and Delphi. Example programs for these languages are available upon request.

Download the latest drivers from [www.solartronmetrology.com](http://www.solartronmetrology.com)

## Orbit® support pack for Excel®

The Orbit Excel Support Pack enables the user to take readings from the Orbit Network and place values directly into cells of a Microsoft Excel spreadsheet.

Following installation of the Excel support pack, a toolbar becomes available to the user and enables commands such as "Take Readings", "Zero Readings", "Close Link", etc., The Orbit Excel Support Pack disc contains examples to help you get started, each designed to show different aspects of the software. Download the latest drivers from [www.solartronmetrology.com](http://www.solartronmetrology.com)

## Orbit® examples for LabVIEW®

Solartron Metrology provides program examples to enable users to develop applications under the National Instruments LabVIEW environment. Examples are also provided to allow quick test application tests, such as taking measurement readings from Digital Probes or Linear Encoders into LabVIEW.

Compatible with Windows XP, Vista, Windows 7 32 bit. Check with your local sales office for 64 bit compatibility

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Delphi®, C++ Builder® are registered trademarks of Borland Software Corporation.

LabVIEW® is a registered trademark of National Instruments.

Orbit® is a registered trademark of Solartron Metrology.





# SI 1500

Panel mount display / controller



- ▶ Red 7 digit display
- ▶ RS232 or RS485 Serial outputs
- ▶ VDC or 4-20 mA outputs
- ▶ Low, OK, High lamps and relays
- ▶ Peak Hold

The SI 1500 is a cost effective yet versatile panel mount single channel display specifically designed for use with Solartron's high performance Orbit® based Digital Probes, Linear Encoders and Modules.

Dimensions	
Case size (incl. bezel)	H = 48mm x W = 96 x D = 137mm
Panel cut out	H = 44.5mm x W 93mm
Depth behind panel (inc. terminals)	135mm
Display	
Display Type	7 digit red led
Display Update Rate	Up to 10 readings/second
Indicators	Low, OK and High warning lamps
Range	-99.9999 to +99.9999
Resolution	1mm to 0.1um (user selectable)
Bandwidth/response time /sensor reading rate	Up to 100 readings/second
Discrete Inputs	Zero, Peak(+Peak/-Peak/Difference), Hold
Outputs	
Analogue	4-20 mA, -5V to +5V, -10V to +10V, 0V to +5V, 0V to +10V (selectable)
Discrete	Alarm Relay - Open Collector
	Low, OK and High
	Relay Response Time = 0.1-9.9 seconds (selectable)
Communications	
Serial Port	RS232 or RS485 Configurable
Power	
Voltage	+24 VDC
Current	850 mA Max
Environmental	
Operating Temperature	10°C to 40°C
Storage Temperature	-10°C to 70°C
Electrical Immunity	EN6100-6-2:2007
Electrical Emissions	EN61000-6-3:2007
Front Panel Sealing	IP65

# SI 3500

Twin axis display / controller

orbit<sup>3</sup>



- ▶ Intuitive menu
- ▶ 2 channel 7 digit colour displays
- ▶ 2 channel analogue colour displays
- ▶ Auto colour change for in/out range
- ▶ Auto course/fine resolution
- ▶ Peak hold facility
- ▶ Data logging facility
- ▶ RS232 output
- ▶ Discrete I/O
- ▶ 4-20mA or DC output

Specifically designed for use with Solartron's high performance Orbit<sup>®</sup> network, the SI 3500 features an intuitive, menu driven-twin axis display which can be programmed to display readings, set Limits/Alarms, Peak Hold, Track, or act as a Data Logger for inputs from one or two transducers.

LCD Display	
Digital	2 x colour
Analogue	2 x colour horizontal bars
Update speed	40Hz
Display length (mm)	± xx.xxxxx (user selectable)
Display length (ins)	± x.xxxxx (user selectable)
Resolution mm	Down to 0.05µm (user selectable)
Resolution ins	Down to 0.000005" (user selectable)
Keypad	
Membrane type with 9 keys	Print, Zero, Up, Down, Left, Right, Enter, Peak Hold/Track, Menu
Measurement type	A, B, A+B, A-B, (A+B/2), (A-B/2), (B-A/a) X and Y
Data Logging	10,000 readings via switch or 1ms to 24hr time interval
Indications	mm/inch, Lower & Upper Limits, Out of Range, Measurement Mode
Power requirement	+24 VDC ± 10%
External I/O	
Serial	RS232 serial port (for printer or PC)
Discrete Output	2 x 3 isolated
Analogue Output	2 channels DC or 4-20mA
Environmental	
Front Panel	IP65
Case	IP51
Rear connection	IP51
EMC	Immunity: EN6100-6-2:2001 Emissions: EN61000-6-3:2001
Storage Temperature (°C)	-20 to +50
Operating Temperature (°C)	0 to +50
Mechanical	
Mounting	Bench top or panel mount
Dimensions WxHxD (mm)	Without bezel 134 x 65x160 With bezel 144 x 74 x 175

# DR 600 and DR 700

Digital readouts



Designed specifically for use with Orbit, the DR 600 and 700 have a 24 character alphanumeric display which guides the user through a series of menus from initial setup to gauging applications and arithmetic operations.

Both DRs have functions:

- ▶ Zero
- ▶ Print
- ▶ Motor Drive
- ▶ Program Select
- ▶ Units
- ▶ Preset
- ▶ Maximum/Minimum
- ▶ Limits/Tolerance
- ▶ Multiple Probes
- ▶ Probe Scan
- ▶ Mathematics
- ▶ Resolution
- ▶ Count Direction
- ▶ Reference Mark
- ▶ Display Freeze
- ▶ Lock

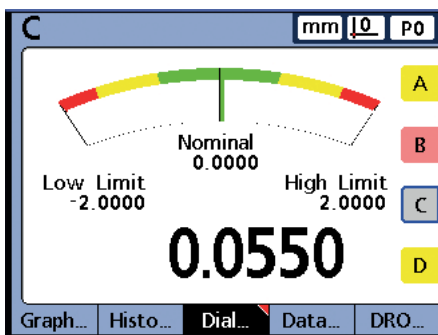
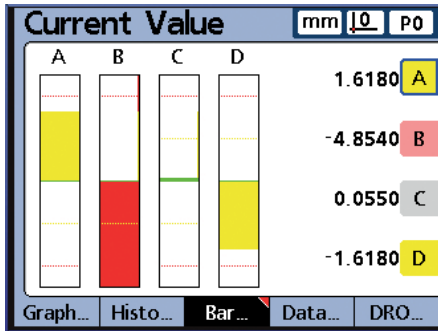
The DR 700 also has:

- ▶ Scaling Factor
- ▶ Max A + Max B
- ▶ Gauging Mode
- ▶ Autosense Mode
- ▶ Peak Mode

	DR600	DR700
Display Type	24 character alpha numeric display	
Display length	±999.9999mm or ±39.370078"	
Resolution	Down to 0.05µm or 0.000005"	
Range Lamps	Indicates Hi/OK/Lo for limited detection	
<b>Input</b>		
Number of Orbit modules	up to 10 without external PSIM example up to 30 with external PSIM example	
<b>External input/output</b>		
Single output	✓	✓
Digital I/O	✓	✓
Motor drive	✓	✓
<b>Measurement configurations</b>		
Individual probe	✓	✓
Probe pair	✓	✓
Multiple probes	✓	✓
Scan	✓	✗
Gauging mode	✗	✓
<b>Electrical</b>		
Power supply (VAC)	96 to 244	
Line frequency (Hz)	47 to 440	
<b>Environmental</b>		
Storage temperature range (°C)	-20 to + 60	
Operating temperature range (°C)	0 to +40	
Humidity	0 to 95% non condensing	
Safety rating	EN61010-1	
EMC	Emission: EN50081-1 Immunity: EN50082-2	
IP rating	Front panel: IP65 Unit: IP40	
<b>Mechanical</b>		
Dimensions (mm)	235 x 190 x 90	
Weight (kg)	2.25	

# SI 7500

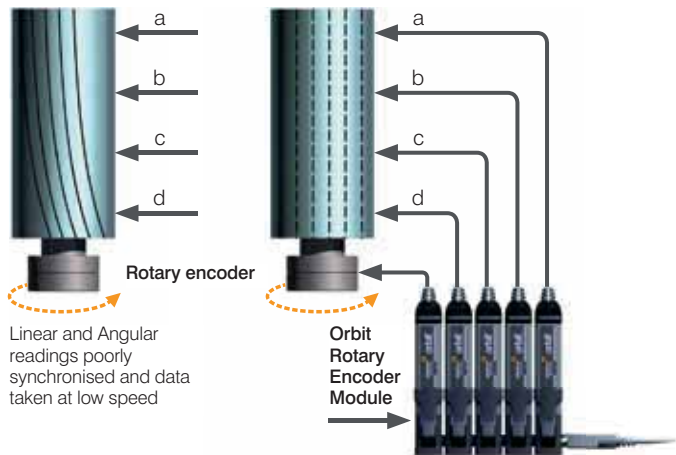
Multi channel controller



- ▶ Up to 16 digital probes / modules
- ▶ Up to 100 parts storable
- ▶ SPC support
- ▶ Suite of mathematical functions
- ▶ Intuitive menu system
- ▶ Clear graphical display

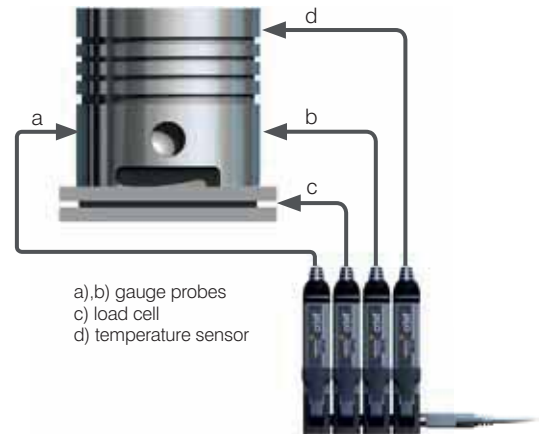
The SI 7500 is a multi axis metrology display that connects to a Solartron Metrology Orbit Network and accepts up to 16 Orbit Module inputs; such as Digital Probes, Linear Encoders and Analogue Input Modules. It features intuitive displays, helpful audio cues and user defined formulas. The SI 7500 also reports dynamic Min/Max measurements, provides SPC analysis from an integrated database and offers connectivity to PC's and other peripherals.

SI 7500	
Display type	6" Colour LCD
Resolution	0.0001mm or 0.000004"
Inputs	
Signal Input	Orbit
Connection type	Orbit Network Cable
Number of Orbit Modules	16
Additional Input/Outputs	Remote Switch, USB Port, Remote Keypad, Parallel Data Port, RS232C Serial Port, Relay Outputs x 2
Electrical Interface	
Power Supply (VAC)	85 to 264
Line Frequency (Hz)	43 to 63
Environmental	
Storage Temperature (°C)	-20 to +60
Operating Temperature (°C)	0 to +45
Humidity	0 to 95%, non condensing
Safety Rating	EN 61010-1
EMC	EN 55011:1998, EN50082-2:1995
Mechanical	
Enclosure WxHxD (mm)	292.1 x 190.5 x 69.85
Base WxHxD (mm)	254 x 50.8 x 190.5
Enclosure Weight (Kg)	1.59
Base Weight (Kg)	3.18



## Synchronising data

Linear and Angular readings accurately synchronised using an Orbit Rotary Encoder Module and data from linear measuring sensors taken at high speed with the Orbit Network set in Dynamic Mode.



## Orbit multiple sensor technology

Gauging components, such as automotive pistons and con' rods, with temperature compensation and weight measurement within the same measuring station. Orbit can also accept strain and pressure sensors where required. See pages 4 and 15.



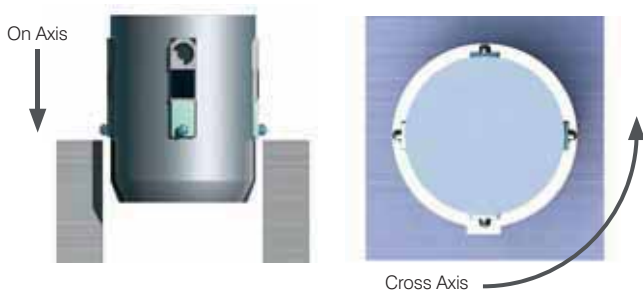
## Measuring angles

The precision measurement of angles requires high resolution + excellent linearity and repeatability.



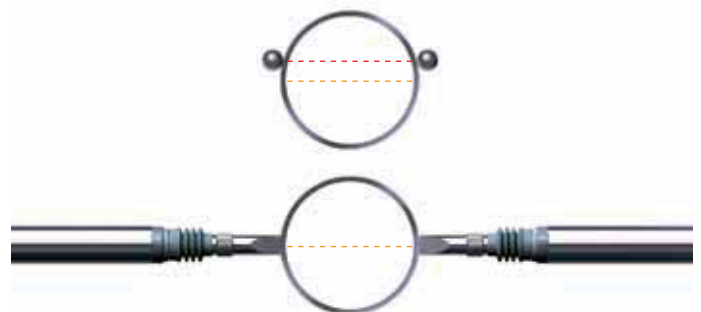
## Automatic gauging systems

Automatic on line or post process is made possible with pneumatic probes and mechanical Interfaces. See pages 10 and 12.



## Inside diameter gauging

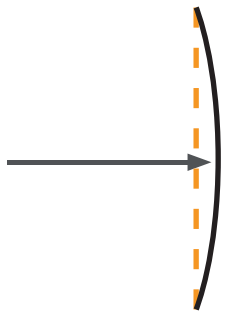
Dynamic Bore Gauging using Mini Probes with Orbit set in Dynamic Mode and resolution set to  $0.1\mu\text{m}$ . See page 12.



## Outside diameter gauging

2 probes configured A+B/2 is a common method used to measure diameters. If the centre line of the ball in a ball tip is not perfectly aligned to the centre line of the component, errors can occur. The type of tip chosen for a gauging application can have a significant effect on accuracy. A tip with a knife edge or pin is often a better solution in this type of application. For a selection of tips, see page 34.

# Application examples

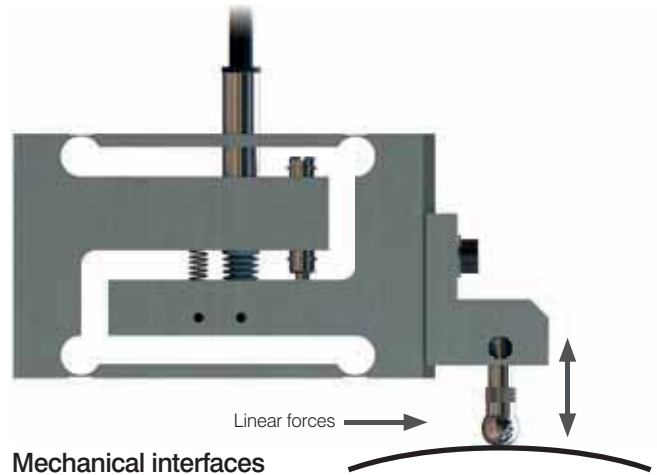


## Low tip forces

Tip force is critical when gauging fragile or flexible components.



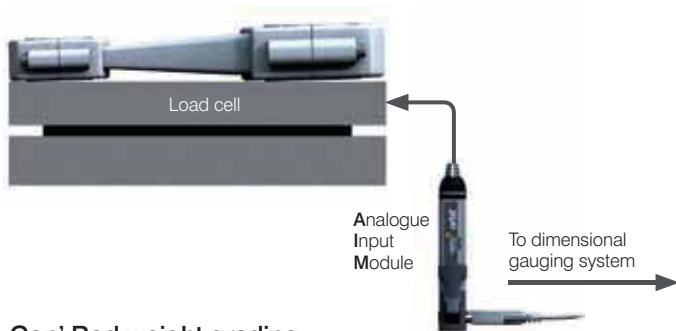
For low and very low tip force probes and special tips, see pages 8 and 10.



## Mechanical interfaces

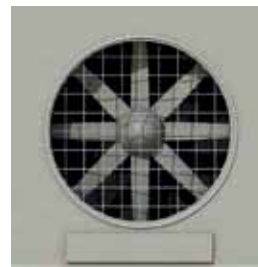
Flexures have the best overall performance for contact measurement of moving material. Linear forces through the flexure and no sliding components within the flexure help to ensure excellent performance and a very long life. See page 12.

## Force, temperature and pressure measurement



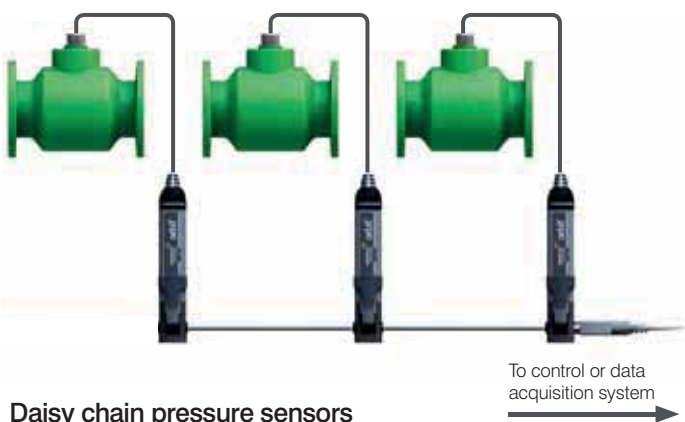
## Con' Rod weight grading

By using the Orbit system to balance sets of automotive connecting rods, the customer is able to use the same software as the dimensional gauging system. A significant cost reduction can be achieved by reducing the number of sensor signal processing systems and the associated software.

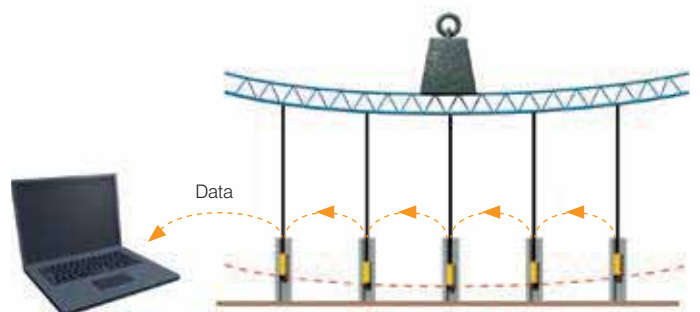


## Temperature and pressure

Research into the temperature and air pressure in automotive heating and air conditioning systems is made easy with Orbit Analogue Input Modules and the Excel® support pack.



## Daisy chain pressure sensors

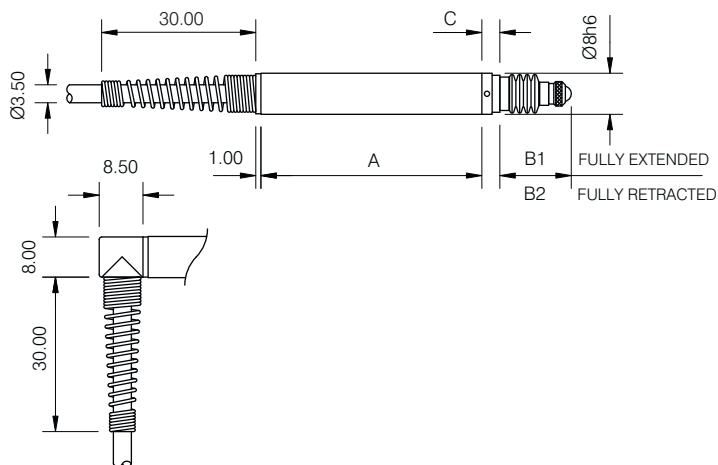


## Measuring the change of the shape of a structure

Measuring the change of the shape of a structure and its recovery after being stressed is a common problem. The Orbit multi drop data acquisition system can take readings from a mix of Displacement, Strain, Pressure and Temperature sensors.

**Standard Spring Push (DP/S)**

	DP/2/S	DP10/2/S	DP/5/S	DP/10/S	DP/20/S
A	47.50	75.00	66.50	90.50	127.00
C	2.00	4.00	2.00	2.00	3.00
B1	13.90	25.40	17.40	25.40	44.90
B2	10.90	14.40	11.40	14.40	23.90

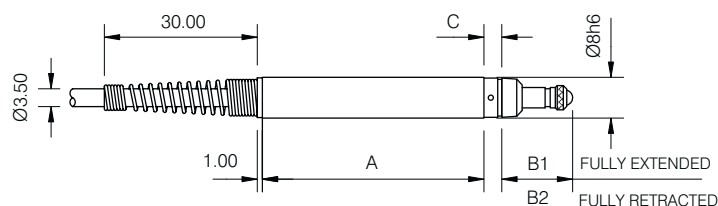


**Right Angle Standard Spring Push (DP/R)**

Plastic adaptor kit turns cable through 90° where axial space is limited.

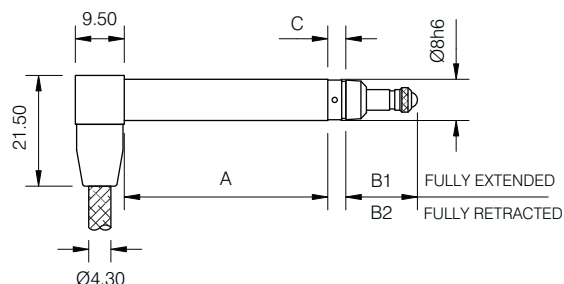
**Feather Touch Spring Push (DT/S)**

	DT/2/S	DT/5/S	DT/10/S	DT/20/S
A	47.50	66.50	90.50	127.00
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	33.90
B2	10.90	11.40	14.40	12.90



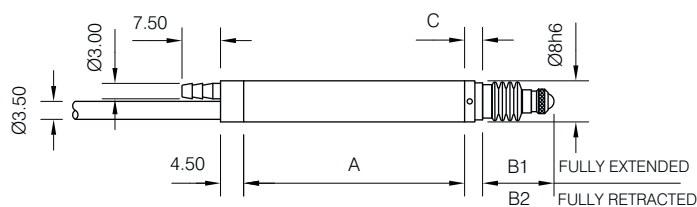
**Right Angle Feather Touch Spring Push (DTR/S)**

	DTR/2/S	DTR/5/S	DTR/10/S	DTR/20/S
A	33.50	52.50	76.50	113.50
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	33.90
B2	10.90	11.40	14.40	12.90

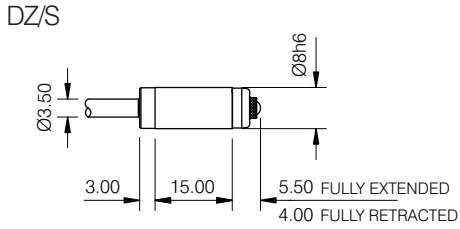


**Vacuum Retract (DP/V)**

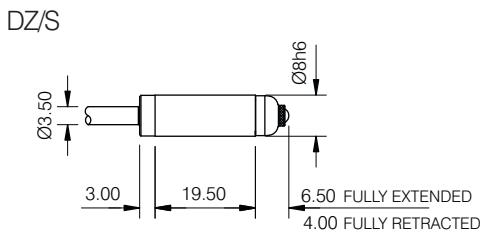
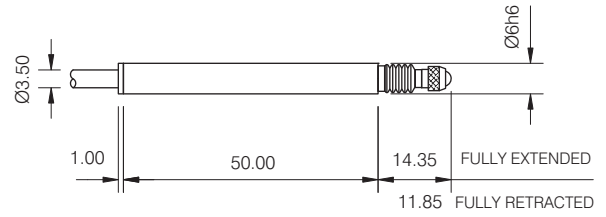
	DP/2/V	DP/5/V	DP/10/V	DP/20/V
A	46.00	65.00	96.00	127.00
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	44.90
B2	10.90	11.40	14.40	23.90



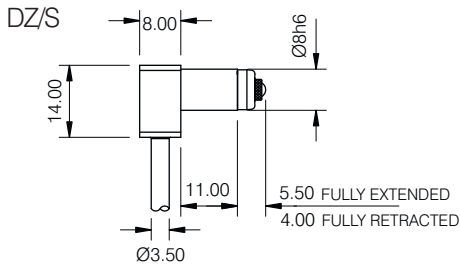
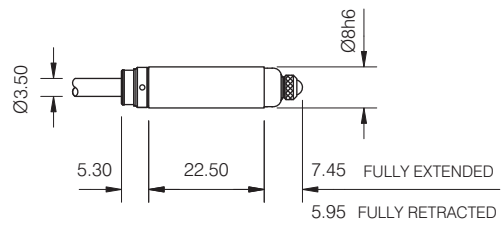
**Compact Spring Push (DZ/S)**  
**Right Angle Compact Spring Push (DZR/S)**



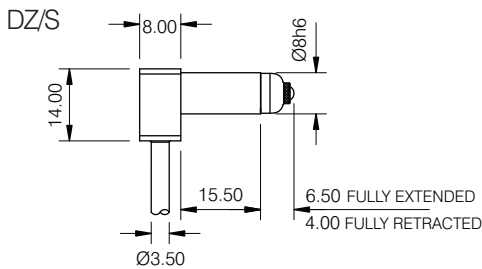
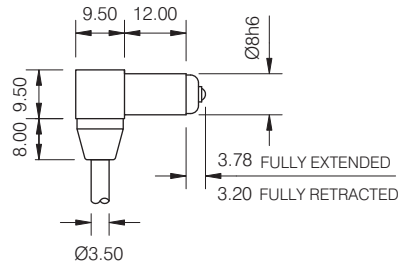
**Slim 6mm Ø Spring Push (D6P/2/S)**



**Ultra Short Spring Push (DP1/S)**



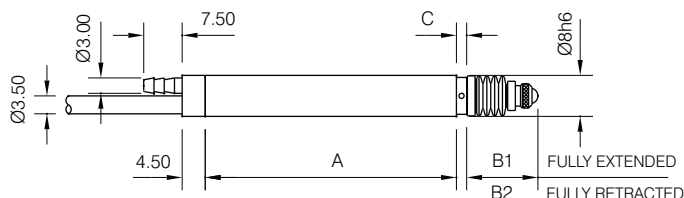
**Ultra Small Spring Push (DP/0.5/S)**





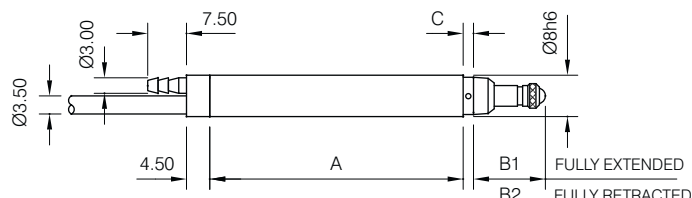
**Pneumatic Push (DP/P)**

	DP/2/PE	DP/2/P	DP/5/P	DP/10/P	DP/20/P
A	84.00	52.50	71.00	96.00	127.00
C	2.00	2.00	2.00	2.00	3.00
B1	25.40	13.90	17.40	25.40	44.90
B2	14.40	10.90	11.40	14.40	23.90



**Feather Touch Pneumatic Push (DT/P)**

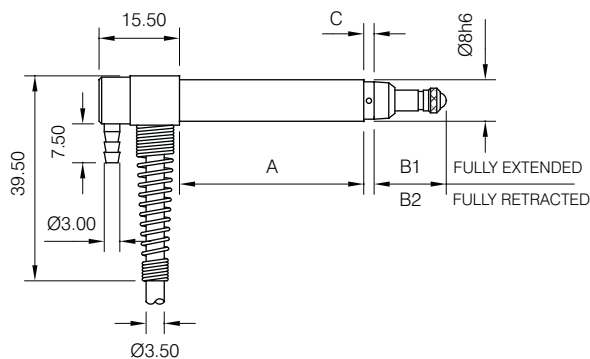
	DT/2/P	DT/5/P	DT/10/P	DT/20/P
A	52.50	71.00	96.00	127.00
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	33.90
B2	10.90	11.40	14.40	12.90



**Right Angled Pneumatic Push (DTR/P)**

90° output/ non braided cable

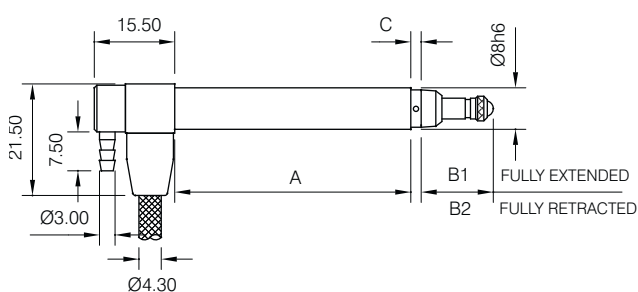
	DTR/2/P	DTR/5/P	DTR/10/P	DTR/20/P
A	38.50	57.50	82.50	113.50
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	33.90
B2	10.90	11.40	14.40	12.90



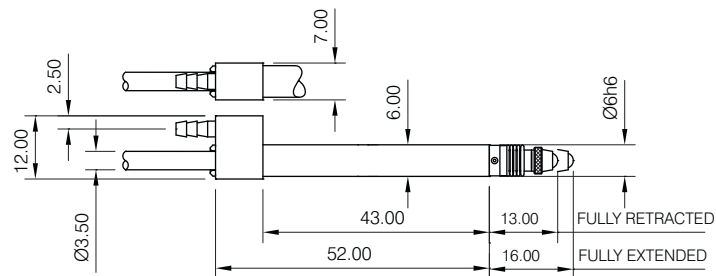
**Right Angled Feather Touch Pneumatic Push (DTR/P)**

90° output/ braided cable

	DTR/2/P	DTR/5/P	DTR/10/P	DTR/20/P
A	38.50	57.50	82.50	113.50
C	2.00	2.00	2.00	3.00
B1	13.90	17.40	25.40	33.90
B2	10.90	11.40	14.40	12.90

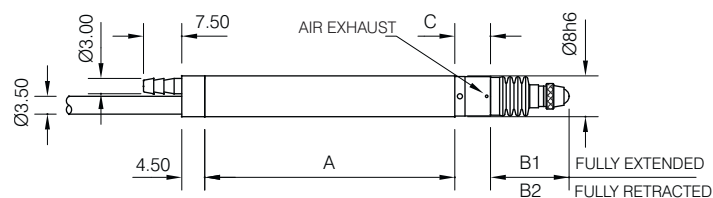


**Gaiter Independent Slim 6mm Ø Pneumatic Push (D6J/2/P)**

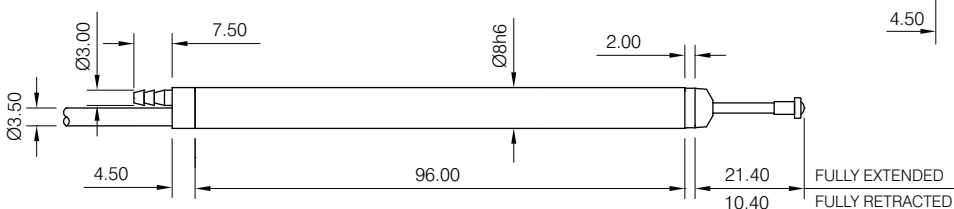


**Gaiter Independent Pneumatic Push (DJ/P)**

	DJ/2/P	DJ10/2/P	DJ/5/P	DJ/10/P
A	52.0	84.0	71.0	96.0
C	7.0	7.0	7.0	7.0
B1	15.4	26.9	18.9	26.9
B2	12.4	15.9	12.9	15.9

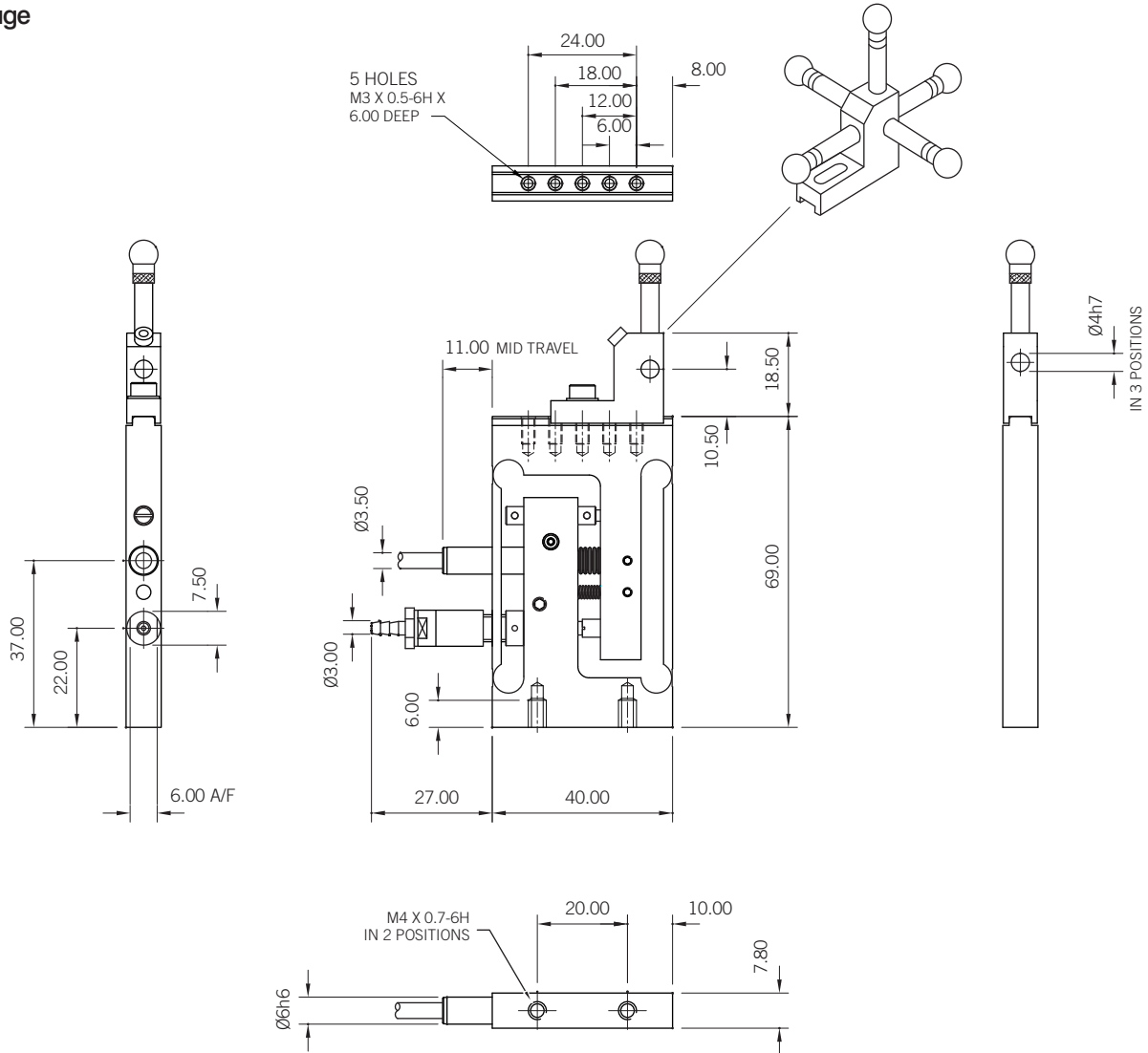


**Ultras Feather Touch Pneumatic Push (UT/10/P)**

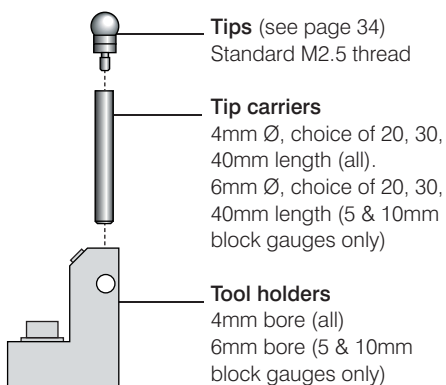




**Flexure gauge**



**Block gauge / Flexure gauge accessories**



**Pneumatic actuator**

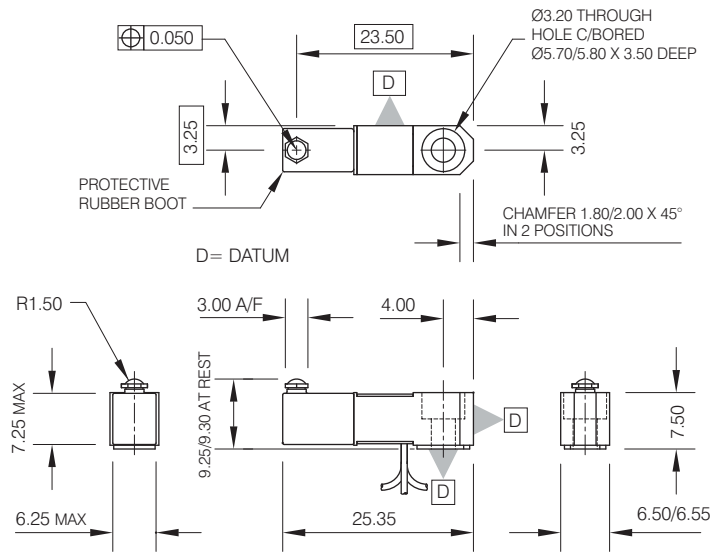
Block gauges and flexure gauges are supplied without pneumatic actuators as standard. Please order separately.



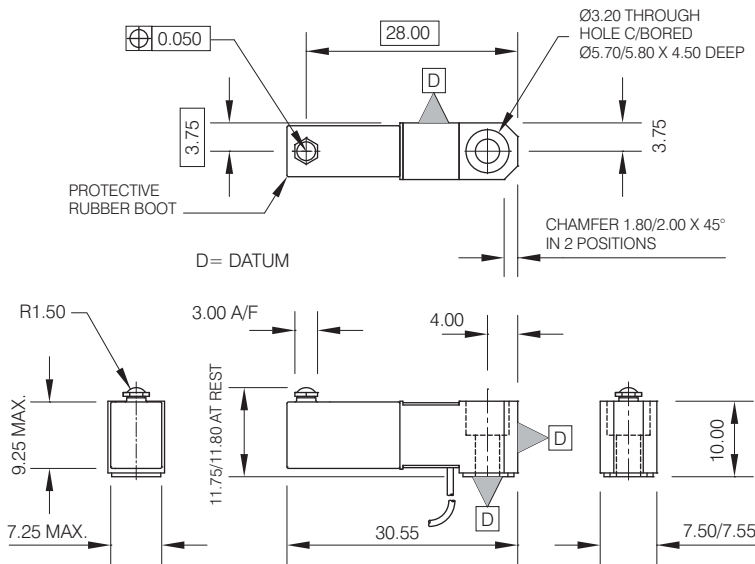
**Block gauge springs**

A set of springs (of different forces) is included with each gauge. Replacements can be ordered individually or as sets.

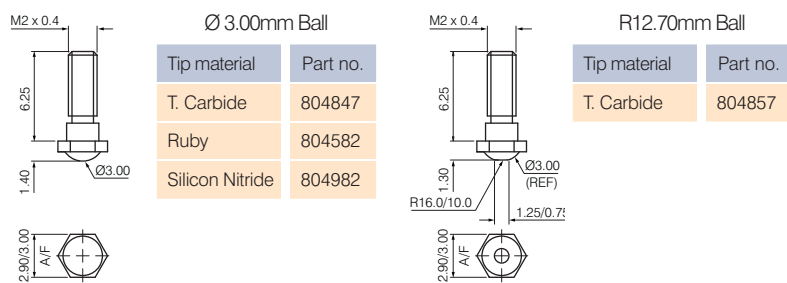
**Mini probe 0.5mm**



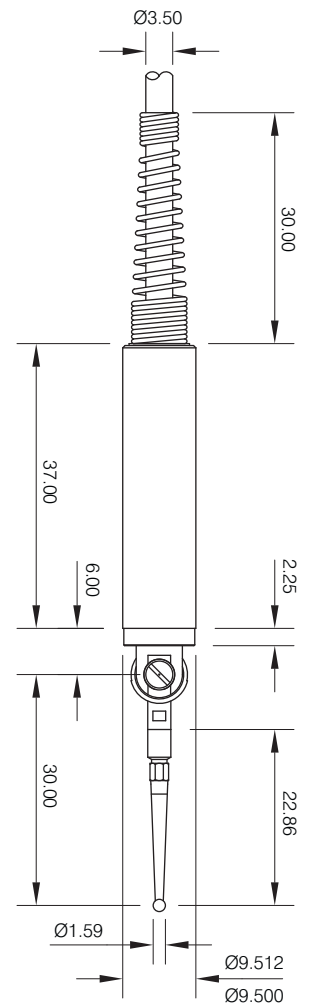
**Mini probe 1.00mm**



**Mini probe tips**

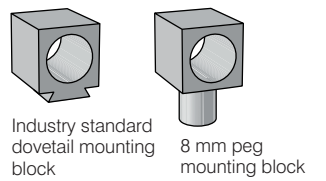


**Lever probe**



**Mounting blocks**

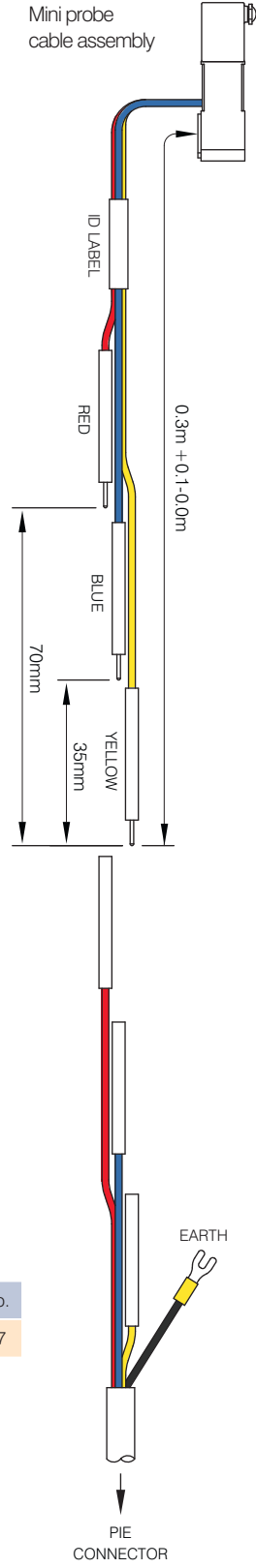
The lever probe can be clamped directly into a 9.52 mm mounting hole. Alternatively the following mounting blocks are available;



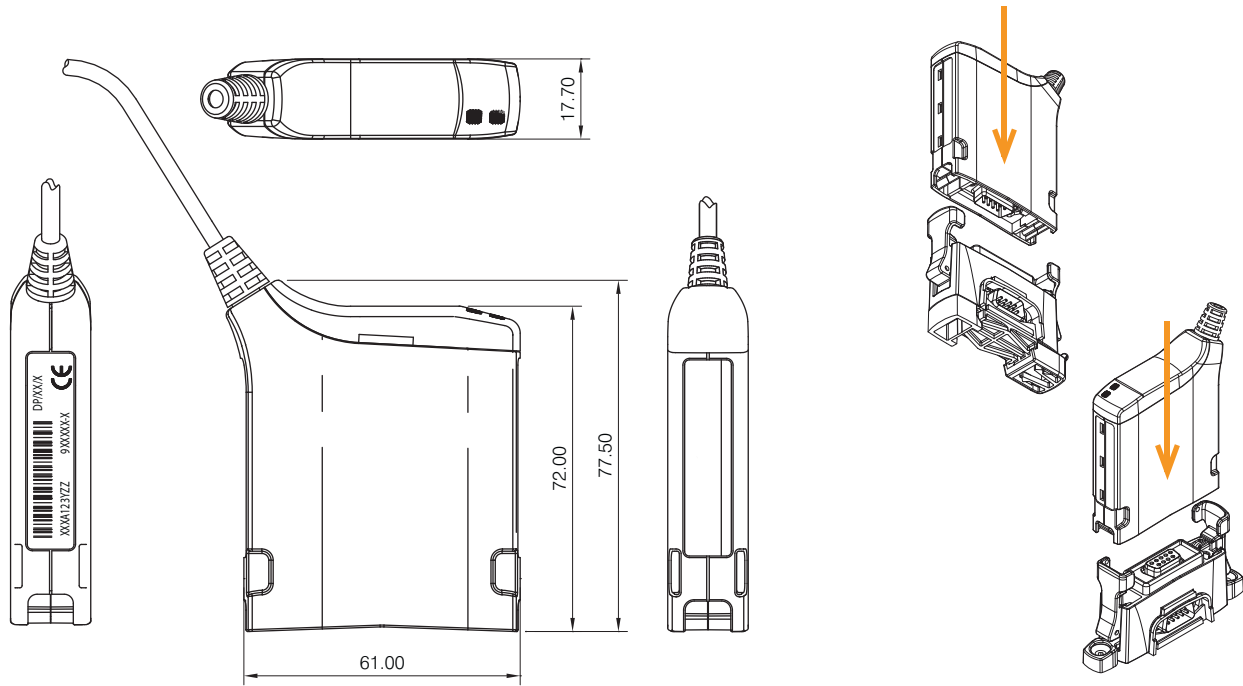
**Ball tipped styli**

Lever probe styli are available in a range of ball diameters. All have 1-75 UNF mounting threads.

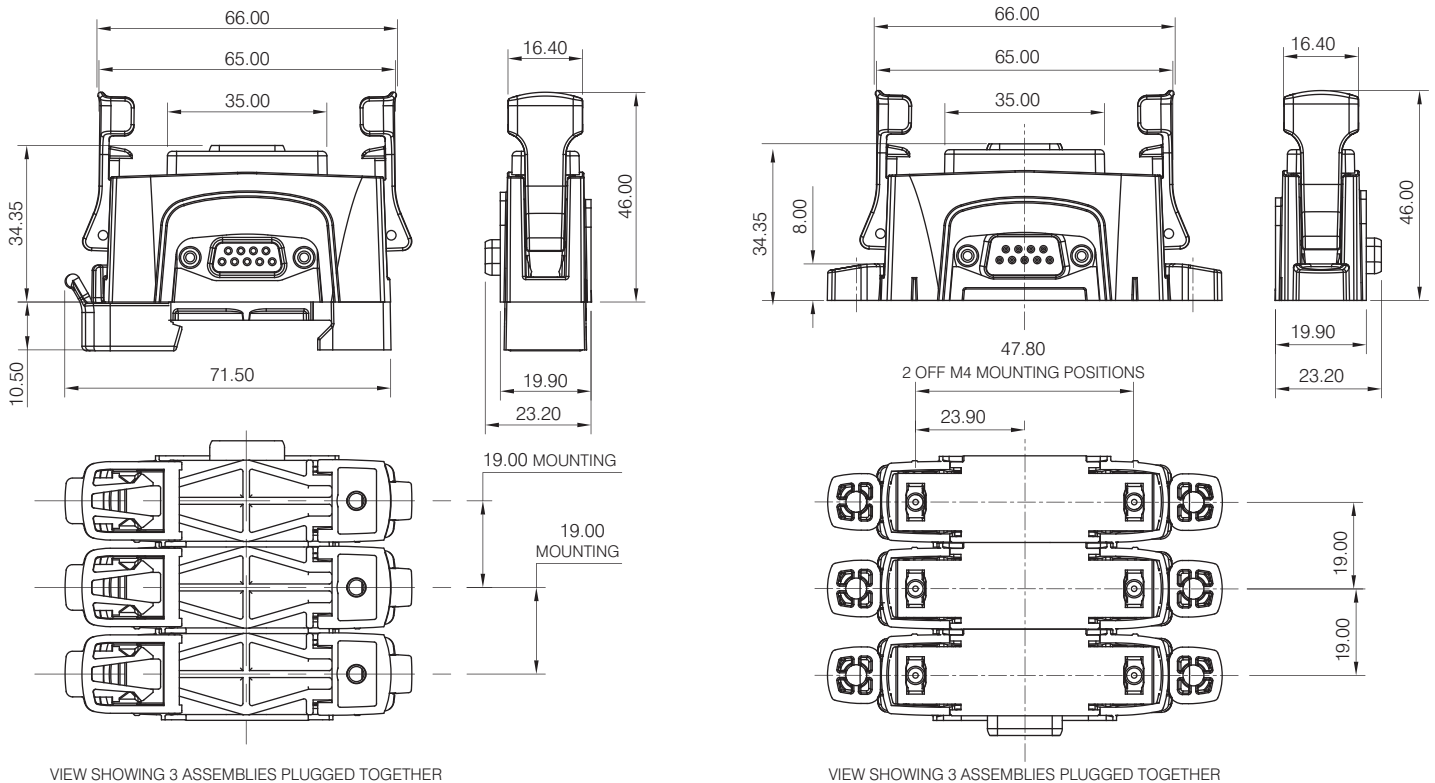
Ball Ø	Stylus
0.38	
0.79	
1.59	
2.54	



PIE (Probe Interface Electronics)



T-CON Orbit network connector



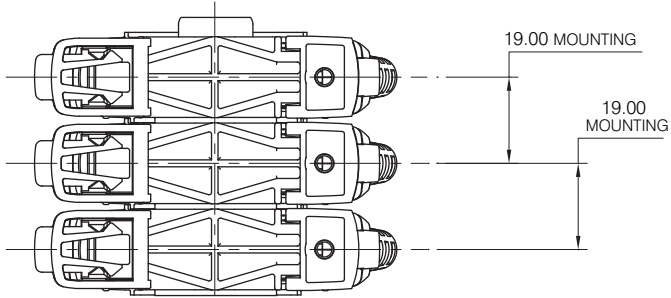
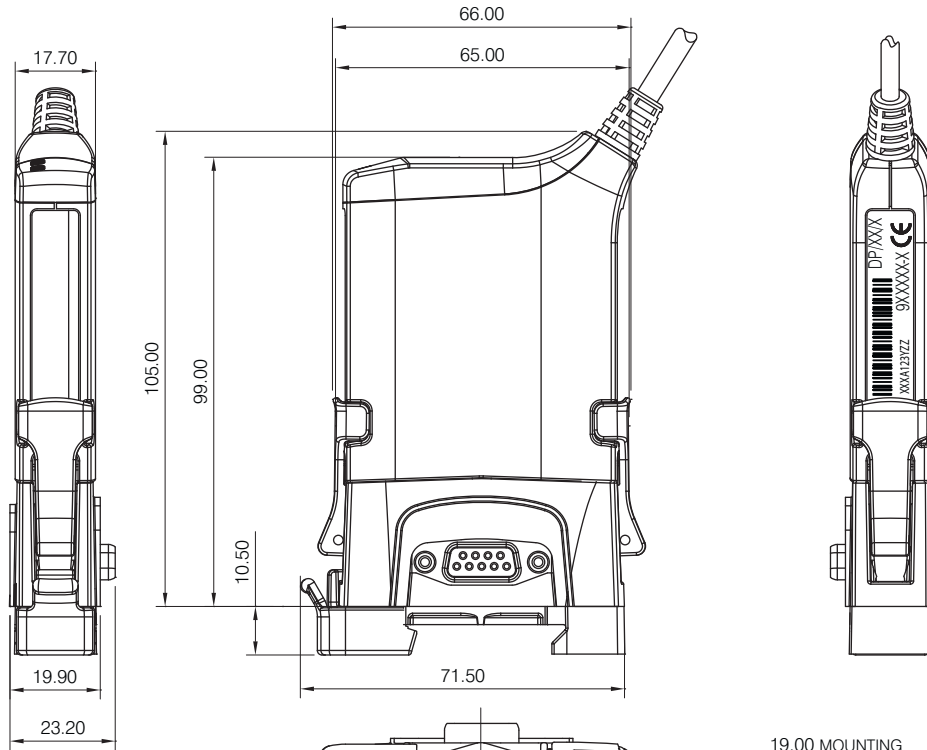
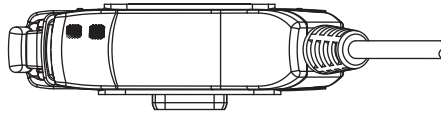
VIEW SHOWING 3 ASSEMBLIES PLUGGED TOGETHER

VIEW SHOWING 3 ASSEMBLIES PLUGGED TOGETHER

T-CON with 32 mm DIN raise connector

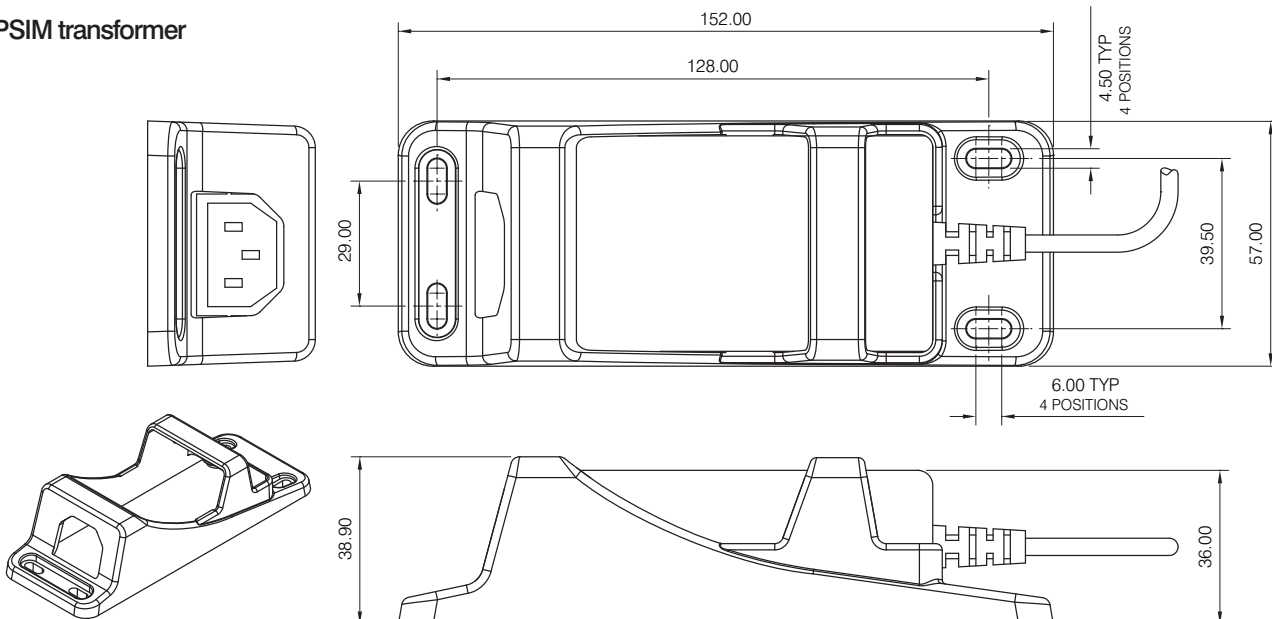
T-CON with mounting feet option

**PSIM (Power Supply Interface Module)**



VIEW SHOWING 3 ASSEMBLIES PLUGGED TOGETHER

**PSIM transformer**



3D VIEW OF MOUNTING BRACKET

# Other Orbit transducers



## Overview



### S Series

The S Series of Displacement Transducers is the culmination of many years' experience gained from Solartron Metrology's highly successful Mach One range plus careful note of market feedback.

- ▶ 5mm to 150mm measurement range
- ▶ <0.2% Linearity FRO
- ▶ Hermetically sealed and submersible on request
- ▶ IP65 or IP67 protection
- ▶ Rugged 19mm diameter stainless steel construction
- ▶ Excellent measurement range to body length ratio
- ▶ Large bore to core clearance
- ▶ Wide range of accessories



### SR Series

Based on the S Series, SR ruggedised displacement transducers are designed specifically for use in challenging environments in laboratory & test and process applications.

- ▶ 5mm to 150mm measurement range
- ▶ <0.2% Linearity FRO
- ▶ Rugged construction for use in demanding environments
- ▶ IP68 and hermetically sealed versions available
- ▶ Stainless steel body and core carrier



### Optimum Series

With a 9.5mm body diameter, the Optimum Series of LVDT displacement transducers is the ideal choice for process control and research applications where space is limited. Optimum Series transducers are available with free or guided core.

- ▶ Small 9.5mm body diameter
- ▶ Excellent measurement range to length ratio
- ▶ Large radial core to bore clearance
- ▶ 3, 12, 25mm measurement range
- ▶ Rugged stainless steel construction
- ▶ 0.25% Linearity FRO



### LE Series Linear Encoders

- ▶ A choice of 12mm or 25mm measurement ranges
- ▶ Spring, free, pneumatic, cable release
- ▶ Choice of IP65 or IP50 (probe only)
- ▶ Up to 0.4µm accuracy
- ▶ Up to 0.0125µm resolution
- ▶ CE approved
- ▶ Verification / calibration traceable to NPL (National Physical Laboratory)

Solartron Metrology linear encoders are highly accurate optical gauges designed for use in applications where consistent sub micron measurement is required.

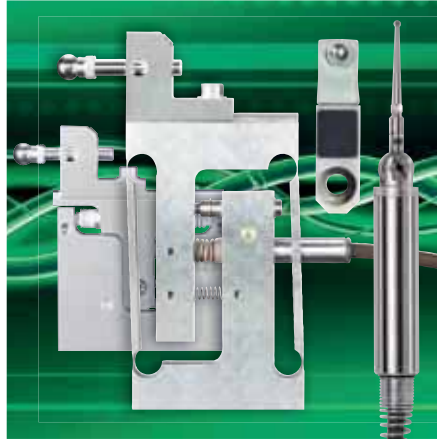
In contrast to traditional gauging probes, accuracy is maintained along the entire measurement range.



### Gauging Transducers

Our extensive range includes Inductive and Optical Encoder Probes and probes with integrated electronics.

- ▶ Measurement ranges from 0.5mm to 100mm
- ▶ Accuracy to 0.1% of reading (inductive) or 0.4 $\mu$ m for encoders
- ▶ Resolution down to 0.01 $\mu$ m or better
- ▶ Probe diameters from 6mm
- ▶ LVDT or Half Bridge
- ▶ Spring push, Pneumatic push or Vacuum retract
- ▶ Precision linear bearings



### Specialist Gauging Transducers

Our Specialist Gauges make precision measurements of miniature parts, bores and cavities a simple and reliable process.

- ▶ Measurement ranges from 0.5mm to 10mm
- ▶ Resolution down to 0.01 $\mu$ m
- ▶ Repeatability: <0.25 $\mu$ m
- ▶ IP65 protection
- ▶ LVDT and half bridge
- ▶ Pneumatic or spring actuation
- ▶ Range of changeable tips



### Position Measuring Transducers

Regardless of whether a miniature displacement sensor is used within a semiconductor manufacturing process, or a submersible transducer is monitoring the deformation of a structure in sea water, the need for reliability over long periods remains the same.

- ▶  $\pm 1$  mm to  $\pm 150$  mm range
- ▶ DC and 4-20mA versions with integral electronics
- ▶ <0.25% Linearity FRO
- ▶ Hermetically sealed and submersible on request
- ▶ IP67 protection
- ▶ Rugged construction
- ▶ High performance
- ▶ Small body diameter
- ▶ Large radial core to bore clearance
- ▶ Rigid stainless steel carriers
- ▶ Wide range of accessories



### Instrumentation and Electronics

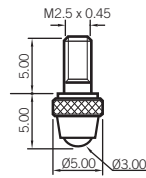
To compliment our range of analogue transducers, we have an extensive choice of Instruments and Electronics. The range includes numerical displays and controllers as well as high performance signal conditioning modules for our LVDT and half bridge transducers.



# Probe tips

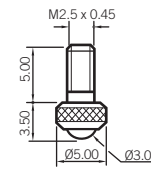


- 1 Type normally fitted to AX Series and tungsten carbide version of feather touch probes
- 2 Shank of 041676 is narrower and longer than 802605. Tip normally used on linear encoders
- 3 Type fitted to nylon versions of feather touch probes



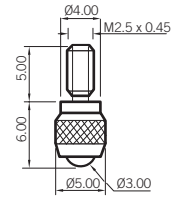
Ø3.00mm Ball

Tip material	Part no.
T. Carbide	804979
Ruby	804807
Nylon	805181
Silicon Nitride	804973



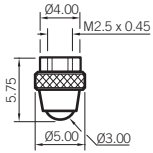
Ø3.00mm Ball

Tip material	Part no.
T. Carbide	802605 <sup>1</sup>
Nylon	803246 <sup>3</sup>



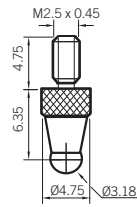
Ø3.00mm Ball

Tip material	Part no.
T. Carbide	041676 <sup>2</sup>



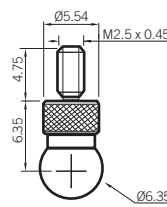
Ø3.00mm Ball

Tip material	Part no.
T. Carbide	804967
Ruby	804966
Nylon	804965
Silicon Nitride	805180



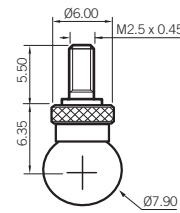
Ø3.18mm Ball

Tip material	Part no.
T. Carbide	008305-004



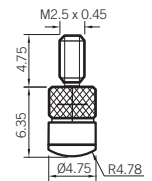
Ø6.35mm Ball

Tip material	Part no.
T. Carbide	008305-005



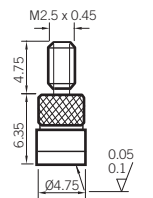
Ø7.90mm Ball

Tip material	Part no.
Ruby	804828



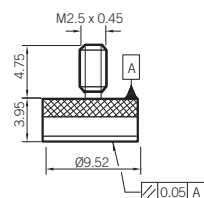
Ø4.75mm Dome

Tip material	Part no.
T. Carbide	008305-034



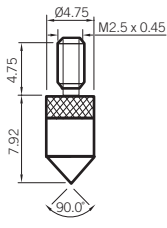
Ø4.75mm Flat

Tip material	Part no.
T. Carbide	008305-033



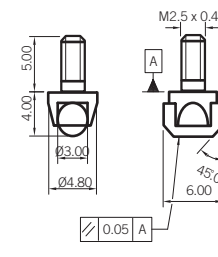
Ø9.52mm Flat

Tip material	Part no.
T. Carbide	008305-007



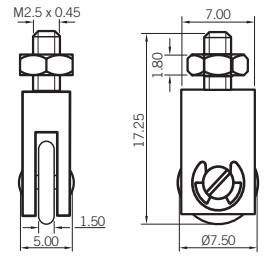
90° Tip

Tip material	Part no.
T. Carbide	008305-003



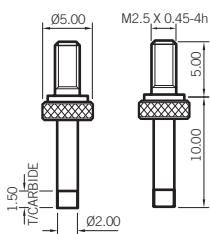
Ø7.90mm Roller

Tip material	Part no.
T. Carbide	008305-030



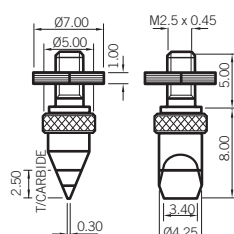
1.5 x Ø7.50mm Wheel

Tip material	Part no.
Steel	008305-027



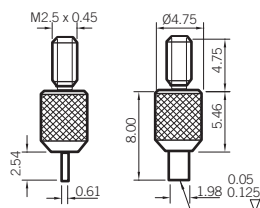
Ø2.00mm Pin

Tip material	Part no.
T. Carbide	206675



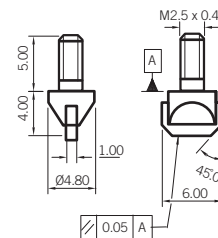
Knife Edge

Tip material	Part no.
T. Carbide	206674



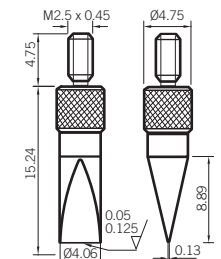
0.6 x 2mm Blade Edge

Tip material	Part no.
T. Carbide	008305-035



1 x 6mm Blade Edge

Tip material	Part no.
T. Carbide	008305-031



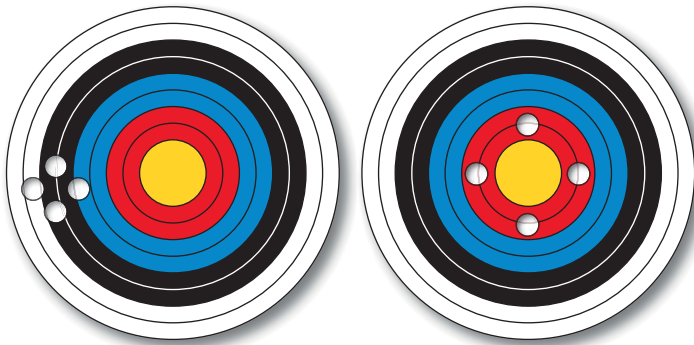
4 x 11mm Knife Edge

Tip material	Part no.
T. Carbide	008305-036

## Glossary of terms, Sensors

### Accuracy, Precision and Repeatability

- ▶ A sensor has limited use if a measured value can not be accurately repeated.
- ▶ A sensor can be considered to be Precise in that its measured values are repeatable.
- ▶ A sensor can produce precise yet inaccurate readings.



*Precise but not Accurate*

*Accurate but not Precise*

To be of true value, linear measuring sensors need to be both Accurate and Precise.

Orbit Digital Sensors are very linear over their full range, and are therefore accurate.

They have excellent repeatability, and are therefore precise.

### Accuracy

The accuracy of all Solartron Metrology Digital Sensors is quoted as % of reading, which is the method that is least open to interpretation (as opposed, for example, to best fit).

### Repeatability

Repeatability is defined as the ability of a sensor to provide measurements within a close distribution on the same measure and carried out in the same direction.

Solartron uses a method of establishing repeatability where a side load is applied in four directions to reflect how sensors are used in most applications. Methods of establishing repeatability without applying a side load may produce better results but may not be representative of real life applications.

## Glossary of terms, Orbit 3

### Orbit Module

A module that can be connected to the Orbit System as part of a Network Channel. Modules perform various measurements and interface to the external world.

### Orbit Controller

Hardware that controls a network of modules and is used for communicating with the modules. The controller provides the link between the Orbit Network and a PC or PLC.

### Orbit3 Channel

A channel of an Orbit Controller that is capable of supporting a network of modules. Channels are numbered either Channel 1 or Channel 2. (Channel 2 only exists depending on type of controller.)

### PIE

Probe Interface Electronics.

### T CON

A 3 way connector containing an E PROM to provide the address of a sensor or module in the Orbit Network.

### Dynamic Synchronization Pulse

Pulse sent from Dynamic capable Orbit Controller which tells the Orbit Modules to take a reading. This pulse is either generated by an Orbit 3 controller or by another Orbit Module that is given authority to generate the synchronization pulses by the controller. This is particularly useful when using the Encoder Input Modules, allowing synchronized measurements between angular and linear measurement, e.g. profiling.

### Reading rate and module relationships

Reading rate in readings per second	Number of modules	Term used to describe
3906	8	4k mode
1953	16	2k mode
976	31	1k mode

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OC2010/01/E