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ULTRA PRECISION TECHNOLOGIES

Solartron Metrology
Precision Driven

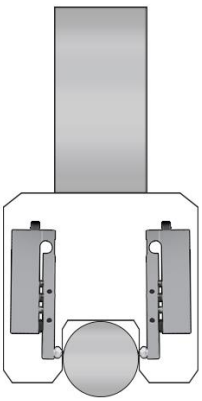
Single Leaf Measurement Transducers

A new range of Flexure Measurement Sensors

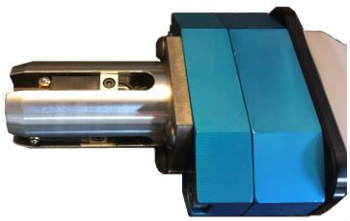
- Sensors to measure hard to reach areas such as bores and gaps
- Excellent resolution and repeatability
- Robust designs, good for sideload
- **Use to check**: Powertrain components, Crankshafts, Engine Bores, Tight spaces
- **Markets for use:** Automotive, Agriculture, Heavy Industry

DUS *Single Leaf Flexure. 0.5 mm range with excellent resolution and sideload strength*

DUSM *Mini Probe – Mini Single Leaf flexure with 0.5 mm range, IP 68 sealing, with multiple tip configurations*



Example: Use Single Leaf Flexures to check Outer Diameters on a crankshaft



Example: Use Mini Single Leaf Probes for bore gauging on engine cylinders. Excellent for oily environments.

Success Story:
Market: Automotive, Military
Vehicle: Bradley Fighting Vehicle Platform
Application: Check bearings for Transmission races
Products Used: DUS

DUS Single Leaf Flexure

Features

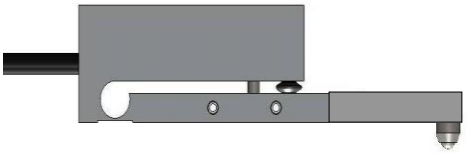
- 0.5 mm range
- Orbit Digital Product for ease of use and best accuracy
- Spring actuation with normal or reverse action.
- IP65 Protection – with non corrosive steel body
- Extension arms

Description

Flexures can be mounted so that there is little stress through the gauging line enabling precision profiling of moving materials such as rotating shafts, brake discs etc. Following from Solartron successful range of parallel flexure products the single leaf flexure offers the gauge builder access to even more measurement points. With careful use of extension arms measurements can be made inside slots or between features where a conventional pencil probe cannot reach.

The standard single leaf flexure is available as both an Orbit Digital product (DUS/0.5/S) or analogue LVDT (AUS/0.25/S)

The DUS and AUS can be configured to operate in either direction, it can also be supplied with an adjustable tip.

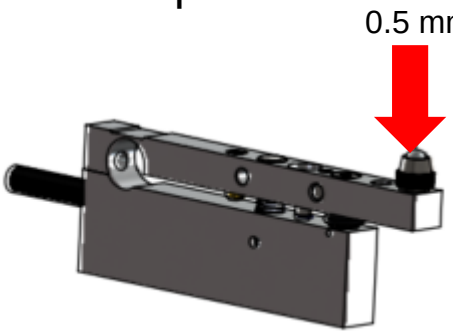


Example of Single Leaf with “Extended Arm”

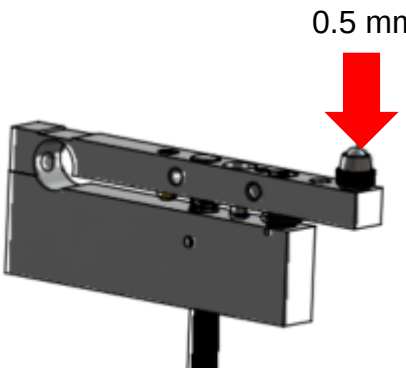
Measuring roundness and run out using extension arms and a ‘reverse’ operation single leaf flexure

Single Leaf - Orientation and Operation

Normal Operation



DUS/0.5/S
AUS/0.25/S

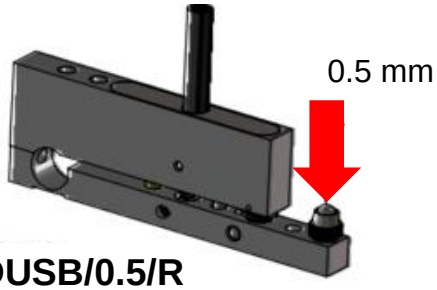


DUSB/0.5/S
AUS/0.25/S

Direction of movement

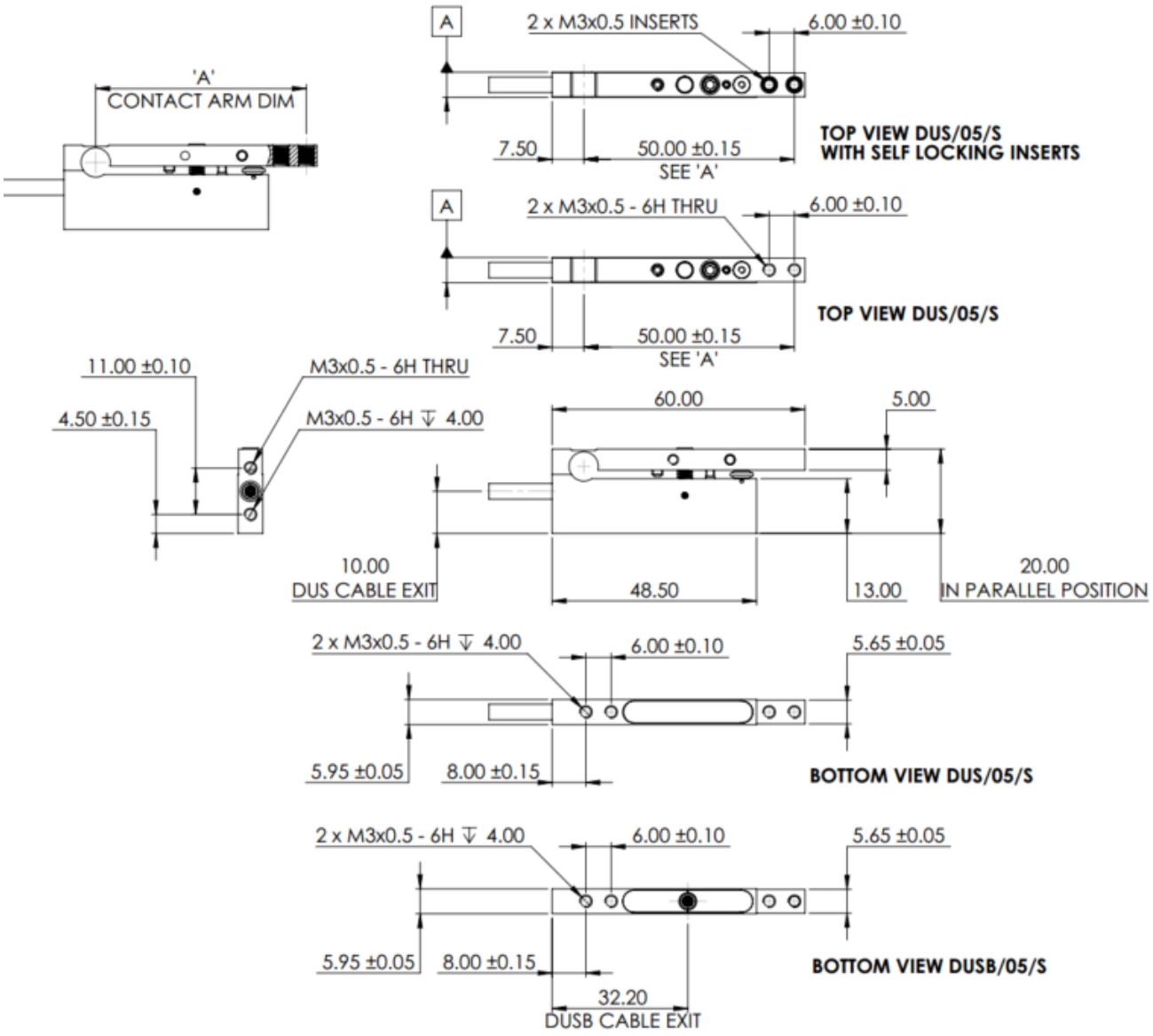
Reverse Operation

DUS/0.5/R
AUS/0.25/R



DUSB/0.5/R
AUSB/0.25/R

Dimensions DUS and AUS



Solartron advise checking of dimensions prior to use by downloading drawings from website or contact sales office for latest issue

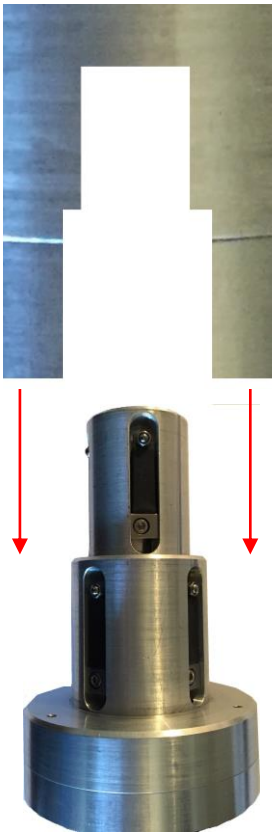
DUSM - Mini Flexure

- Accuracy better than 1 µm
- Excellent Repeatability <0.5 µm
- Measurement range 0.5 mm
- IP68 Sealing
- Multiple Tip Configurations
- Robust design in compact package

The Miniature Single Leaf Flexure is another variant of flexure based contact probes. The miniature single leaf flexure has a calibrated range of 0 – 500 microns and provides the means for alternative configurations of contact tip mounting.

The gauge body mounting to the fixture is accomplished using a single M2.5 screw. Contact tip mounting is attached by using either the integral M3 locking thread insert, primarily intended for use with length extensions, OEM's fixed length contact tips or with Solartron's tip adapter, which when applied with Solartron's dedicated tip allows for 0.5 mm of height adjustment. OEM tips may be fitted to either option, but it is advised that the height be limited to a maximum of 6 mm above the gauge top surface, to avoid significantly prejudicing gauge life and repeatability. Mid adjustment range is the reference point for the calibration using the standard tip.

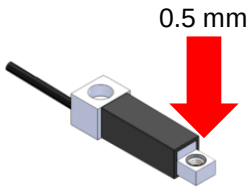
Length extensions may be applied to this style of gauge but should be used with care. A maximum length of 12 mm, between tip and mounting thread, is advised, but this does depend on other variables such as tip height approach angle and measurement deflection – extremes of these conditions will significantly reduce the gauge life and severely degrade the repeatability. To enable direct reading of the gauge using extensions, the use of a software multiplier will be necessary. However, as the reference dimension for the gauge is 18 mm by using a 12 mm extension,

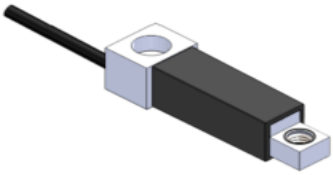


The DUSM can check multiple bores at multiple depths

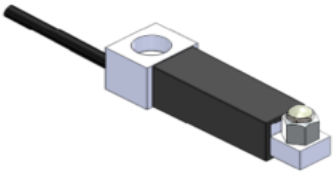
Application: DUSM with Multi Channel Wireless Handle for a Wireless Bore Gauge

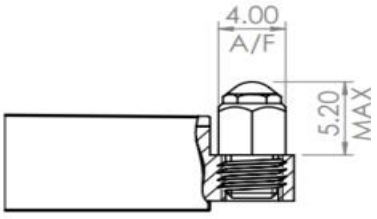
DUSM Tip Options





TYPE 'X'
M3 SELF LOCKING INSERT VERSION

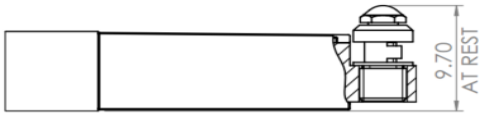


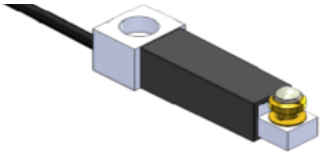


TYPE 'Y'
FIXED TIP ASSY VERSION

FIXED TIP
P/N 210116
TYPE 'Y'

TYPE 'Z'
ADJUSTABLE TIP ASSY VERSION
±0.25mm ADJUSTMENT

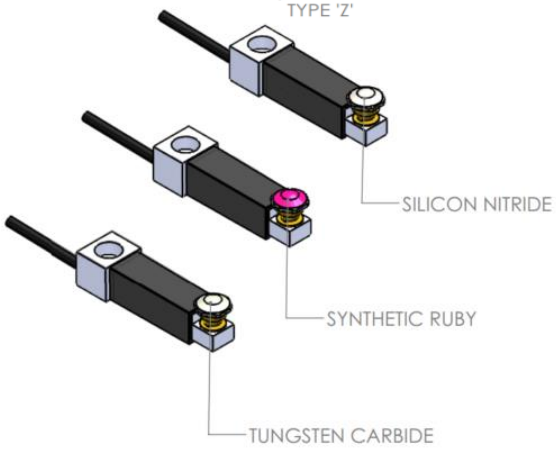




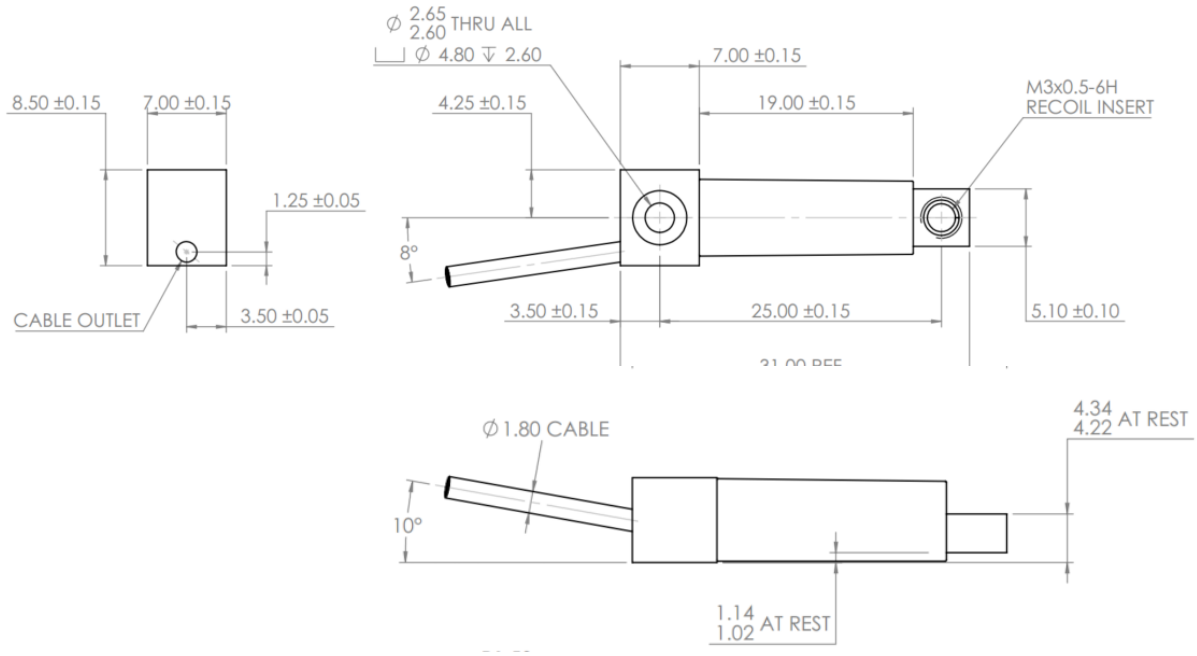
ADJUSTABLE TIP
P/N 208910
TYPE 'Z'

DUSM High Lift Tip

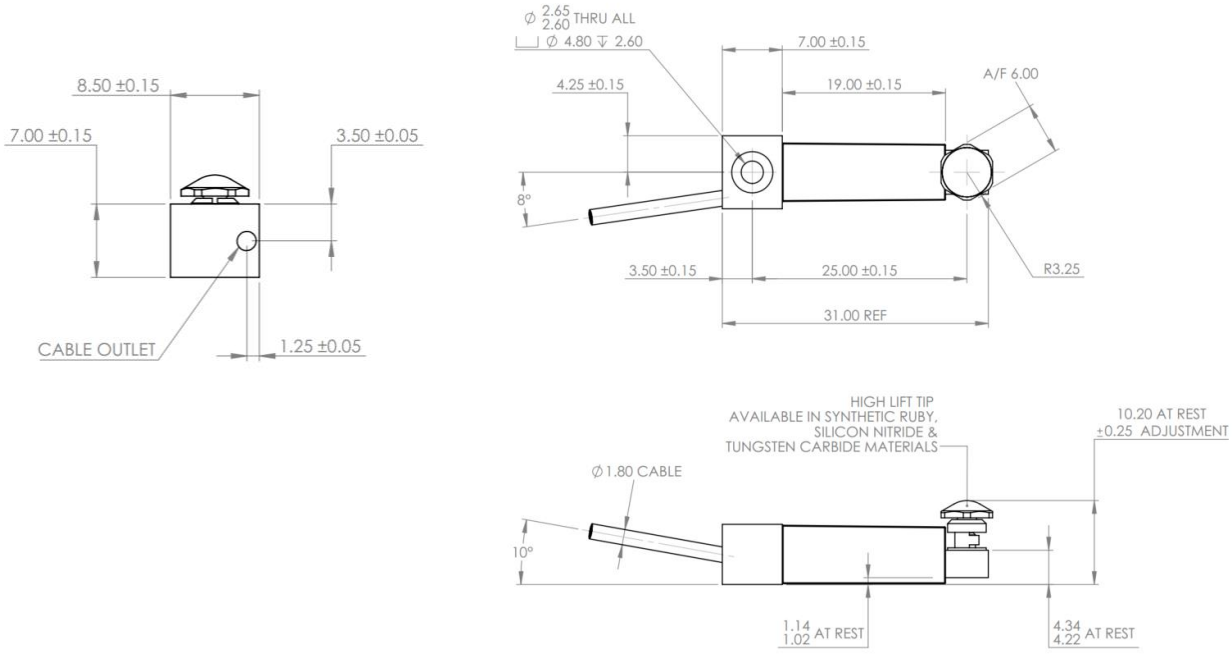
See drawing for dimensions



Dimensions - DUSM



Dimensions - DUSM High Lift Tip Option



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Specifications – DUS and DUSM

Product	Single Flexure	DUSM
Side Cable Outlet	DUS/0.5/S	DUSM/0.5/S
Bottom Cable Outlet	DUSB/0.5/S	N/A
Body Width (mm)	6	7
Measurement Performance		
Measurement Range (mm) (Note 3)	0.5	0.5
Accuracy (% of Reading) (Note 1)	0.1	0.05
Repeatability (µm) (Note 2)	<0.1	<0.1
Resolution (µm)	0.01	0.01
Pre Travel (mm)	0.02/0.03	0.01/0.02
Post Travel (mm)	0.05/0.1	0.07
Tip Force at Middle of Range (N) Spring Push	0.9/1.56	0.27/0.83
Environmental		
Sealing	IP65	IP68
Sealing for Probe Interface Electronics	IP43 for Module and TCON	
Storage Temperature (ºC)	-20 to +80	
Probe Operating Temperature (ºC)	+5 to +60	
Electronics Operating Temperature	+5 to +80	
EMC Emissions	EN61000-6-3	
EMC Immunity	EN61000-6-2	
Shock	Do not subject to excessive shocks or loads	
Life	Greater than 100 million cycles depending on application	
Material		
Flexure Body	17-7 Stainless Steel (Corrosion Resistant)	Stainless Steel
Tips	M3 Thread or M3 Self Locking Heli coil (to fit a M3 tip)	M3 Thread or M3 Self Locking Heli coil (to fit a M3 tip) or Solartron proprietary adjustable tip
Gaiter	Fluoroelastomer	
Cable	PUR Standard	
Electronics Module	ABS	
Electronics Interface		
Orbit®3 Interface Options	USB, RS232, Ethernet, Modbus, Ethernet I/P, Bluetooth	
Reading Rate	3906 readings per second	
Bandwidth of Electronics (Hz) user selectable	460, 230, 115, 58, 29, 14, 7,4	
Power	5±0.25 VDC @ 0.06A typical	

Note 1: Accuracy 0.1 µm or % reading (whichever greater)
Note 2: Repeatability is dependent on the configuration of the tip and arm
Note 3: DU/0.5/S - Range is at 50 mm from the flex point, extension arms will multiply this parameter
DUSM NO extension arm fitted

Specifications – AUS (Analog Single Leaf)

Product	Single Flexure
Side Cable Outlet	AUS/0.25/S
Bottom Cable Outlet	AUSB/0.25/S
Body Width (mm)	6
Measurement Performance	
Measurement Range (mm) (Note 2)	±0.25
Linearity (% of FSO)	±0.3
Repeatability (µm) (Note 1)	<0.1
Resolution (µm)	see Note 3
Pre Travel (mm)	0.02/0.03
Post Travel (mm)	0.05/0.1
Tip Force at Middle of Range (N) Spring Push	 0.9/1.56
Electrical Interface (Note 4)	
LVDT Sensitivity - Plugged ±10% (mV/V/mm)	196
LVDT Sensitivity -Unplugged ±5% (mV/V/mm)	Not Available
LVDT Energising Current ±5% (mA/V)	2.3
Environmental	
Sealing	IP65
Storage Temperature (ºC)	-20 to +80
Probe Operating Temperature (ºC)	+5 to +60
Shock	Do not subject to excessive shocks or loads
Life	Greater than 100 million cycles depending on application
Material	
Flexure Body	17-7 Stainless Steel (Corrosion Resistant)
Tips	M3 Thread or M3 Self Locking Heli coil (to fit a M3 tip)
Gaiter	Fluoroelastomer
Cable	PUR Standard

Note 1: Repeatability is dependent on the configuration of the tip and arm
Note 2: AUS/0.25/S - Range is at 50 mm from the flex point, extension arms will multiply this parameter
Note 3: Depends on Conditioning Electronics
Note 4: LVDT probes are calibrated at 3V RMS @ 7.5kHz, 1MΩ load.

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Sales Offices

UK (Headquarters and Factory)
Solartron Metrology
Bognor Regis, West Sussex, PO22 9ST
Tel: +44 (0) 1243 833 333
Fax: +44 (0) 1243 833 332
Email: sales.solartronmetrology@ametek.com

France
AMETEK SAS
Solartron Metrology Division
Elancourt, 78990 France
Tel: +33 (0) 1 30 68 89 50
Fax: +33 (0) 1 30 68 89 99
Email: info.solartronmetrology@ametek.fr

Germany
AMETEK GmbH
Solartron Metrology Division
40670 Meerbusch
Tel: +49 (0) 2159 9136 500
Fax: +49 (0) 2159 9136 505
Email: vertrieb.solartron@ametek.de

Brazil
AMETEK do Brasil, Ltda
Rod. Eng Ermenio de Oliveira Penteado, Km 57, SP75
Bairro Tombadouro
13337-300, Indaiatuba, SP, Brasil
Tel: +55 19 2107 4126

China
AMETEK Commercial Enterprise (Shanghai) Co., Ltd
Shanghai, 200131, China
Tel: +86 21 5763 2509
Email: china.solartronmetrology@ametek.com

North America
Solartron Metrology
USA Central Sales Office
Gastonia, NC 28054
Tel: +1 800 873 5838
Email: usasales.solartronmetrology@ametek.com

India
Contact Solartron Metrology UK
Tel: +44 (0) 1243 833 333
Fax: +44 (0) 1243 833 332

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Precision Driven...
In the laboratory, on the shop floor or in the field, Solartron Metrology's products provide precise linear measurements for quality control, test and measurement and machine control. Solartron Metrology is a world leader in the innovation, design and manufacture of precision digital and analogue dimensional LVDT gauging probes, displacement sensors, optical linear encoders and associated instrumentation.

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Solartron Metrology pursues a policy of continuous development. Specifications in this document may therefore be changed without notice.