

# orbit3

## Digital Measurement System Special Digital Linear Measuring Transducers

### Features

- Accuracy to **<1 µm (0.00004 in)**
- Excellent repeatability **0.05 µm (0.000002 in)**
- Measurement ranges **0.5 to 10 mm**.
- Precision linear bearings – life **100 million** cycles
- Uses **Orbit® 3** Digital Measurement System for
  - Fast data rates
  - Simple connectivity
  - Multiple sensors on one network



### Description

Solartron Metrology's **Orbit® 3 Measurement System** using Solartron Special Contact Measurement Transducers provides a **cost effective solution** for a wide range of gauging, measuring or positioning in diverse industries. Whether in the laboratory or in a manufacturing environment, Solartron Metrology's extensive range of special transducers offer a solution to most applications.

A **reliable transducer** is essential to any data collection and measurement system. All Solartron transducers are designed to generate reliable data not just from new, but after millions of cycles of operation. This 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 the transducer. Solartron Metrology has complete control in house over all aspects of the design and manufacture of a wide range of linear bearing assemblies and transducers.

The **Solartron Orbit® 3 Network** is a fully formed digital measurement system that makes it simple to inter-connect Solartron Digital contact and non contact transducers and other 3<sup>rd</sup> party transducers to a computer or PLC. Simple connectivity up to 150 transducers on one network with a wide range of network controllers including USB and Ethernet. See the **Orbit® 3 datasheet** for further details.

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

## Precision. Quality. Reliability

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## Special Digital Linear Measuring Transducers (Overview)



### DK Block Gauges

- 2, 5, and 10 mm measuring ranges
- Multiple tool and tip options
- Pneumatic available
- Measure bores and cavities



### DU Parallel Flexure

- Frictionless travel
- Multiple tool and tip options
- Pneumatic available
- 1 and 2 mm measuring ranges
- 8mm wide body



### Mini DU Parallel Flexure

- Frictionless travel
- Just 4mm wide
- 0.5 mm measuring range



### Single Leaf Flexure

- Frictionless travel
- 0.5 mm measuring range



### DM Mini Probe

- Compact transducer for bore
- 0.5 and 1mm measuring ranges



### DL Lever Probe

- As low as 0.05N tip force
- 0.5 to 1mm measuring range

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## Digital Block Gauges

### Features

- Accuracy to  $<1 \mu\text{m}$  (0.00004 in)
- Excellent repeatability  $0.25 \mu\text{m}$  (0.000010 in)
- Measurement ranges 2 to 10 mm.
- Uses **Orbit® 3** Digital Measurement System for
  - Fast data rates
  - Simple connectivity
  - Multiple sensors on one network
- Fully traceable calibration.

### Description

Solartron's Block Gauges makes precision measurements of bores and cavities a simple and reliable process. More generally, the use of these devices is recommended in applications where space is limited and where the use of axial probes is not possible. The 2 mm unit is a miniaturised version in length, height and thickness and is recommended for applications where space is very restricted.

The Block Gauges offer unrivalled ruggedness, accuracy and repeatability. All three units are extremely versatile and provide datum surfaces and all the adjustments required for precision gauging applications.

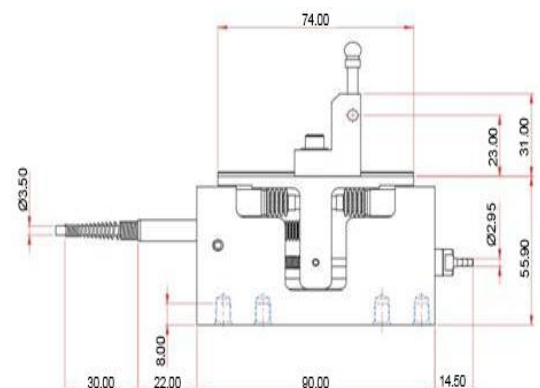
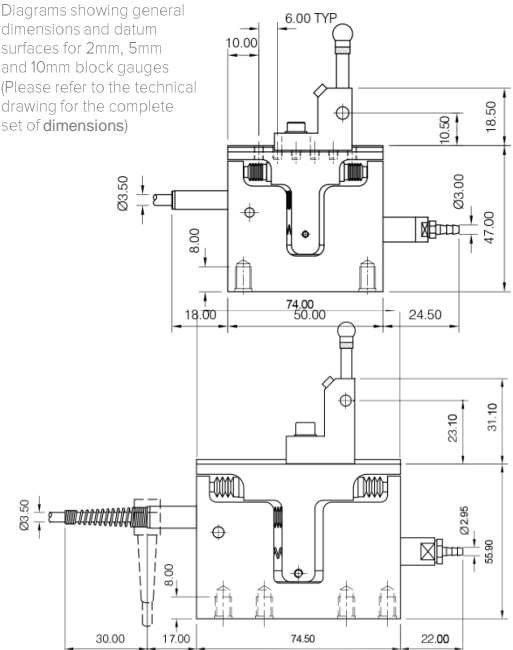
Other features include:

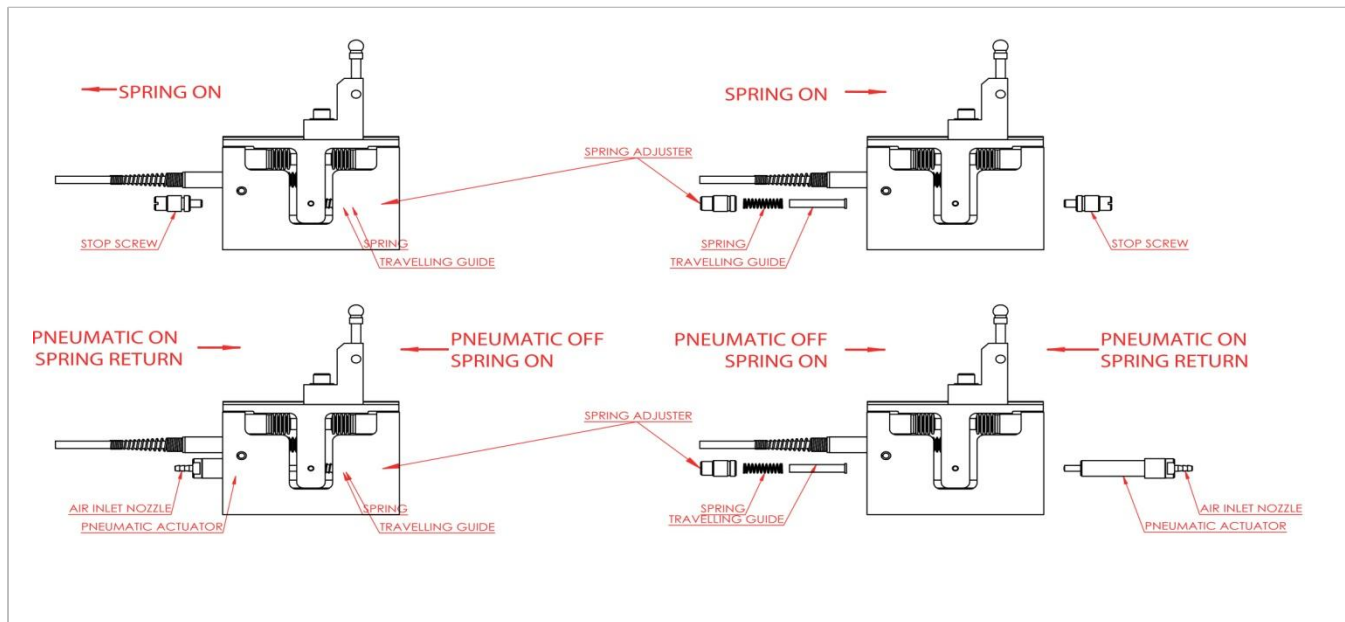
- Compact size
- Pneumatic or spring actuation
- All stainless steel construction
- Large range of changeable tips
- IP65 Protection



### Mechanical Outline

Diagrams showing general dimensions and datum surfaces for 2mm, 5mm and 10mm block gauges (Please refer to the technical drawing for the complete set of dimensions)

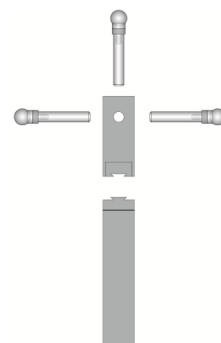




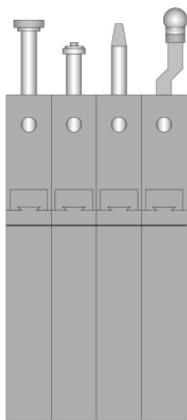
The Block Gauge pneumatic kit enables automatic loading of components. Pneumatic actuation coupled with a spring to control the tip force ensures repeatable measurement results. (fig.1)



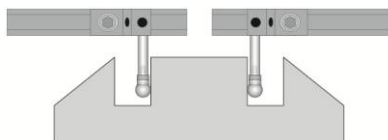
The 5 mm and 10 mm Block Gauges are equipped with an industry standard tool holder. This ensures that the gauge is rigid yet easy to adjust. The tip carriers have an M2.5 fitting that accepts all standard tips. Due to its size, the 2 mm gauge has a modified adjustment system that provides equal rigidity and ease of adjustment. (fig.2)



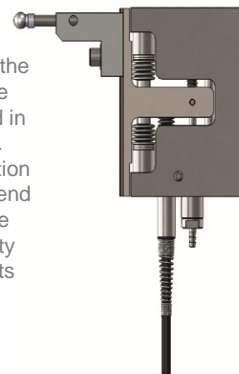
As many Block Gauges as required can be banked close together. The compact configuration and the ability to gauge off the centreline is useful when tightly packed points need to be measured. (fig.3)



Measurements with offset tip are possible with all the units, so to reduce the footprint of the gauge, adjustment along the frame is provided. (fig.4)



A range of springs is available to ensure that the Block Gauge can be used in any attitude. IP65 protection helps to extend the life of the gauge in dirty environments. (fig.5)





# Digital Block Gauges: Technical Specification

Product (Body Width)	8 mm wide	12 mm wide	
Axial Cable Outlet	DK/2	DK/5	DK/10
Radial Cable Outlet	DKR/2	DKR/5	DKR/10

Measurement Performance	2	5	10
Measurement Range (mm)	0.05	0.05	0.08
Accuracy (% of Reading) (Note 1)	<0.25	<0.25	<0.5
Repeatability (µm) (Note 2)	0.01	0.05	0.05
Resolution (µm)	0.15	0.15	0.15
Pre Travel (mm)	0.85	0.85	0.85
Post Travel (mm)	1.5	1.5	1.5
Tip Force (N) at Middle of Range ±20%	0.2	0.5	1
Temperture Coefficient (µm/°C)			

Environmental	
Sealing	IP65
Storage Temperature (°C)	-20 to +80
Block Gauge Operating Temperature (°C)	+5 to +80
Electronics Operating Temperature (°C)	0 to 60
EMC Emissions	EN61000-6-3
EMC Immunity	EN61000-6-2
Shock	Do not subject Block Gauge to excessive shocks

Material	
Block Gauge Body	Stainless Steel
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide
Gaiter	Fluoroelastomer or Silicon
Cable	PUR
Electronics Module	ABS

Electronics Interface (Orbit®3)	
Orbit®3 Interface Options	USB, Ethernet, RS232
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

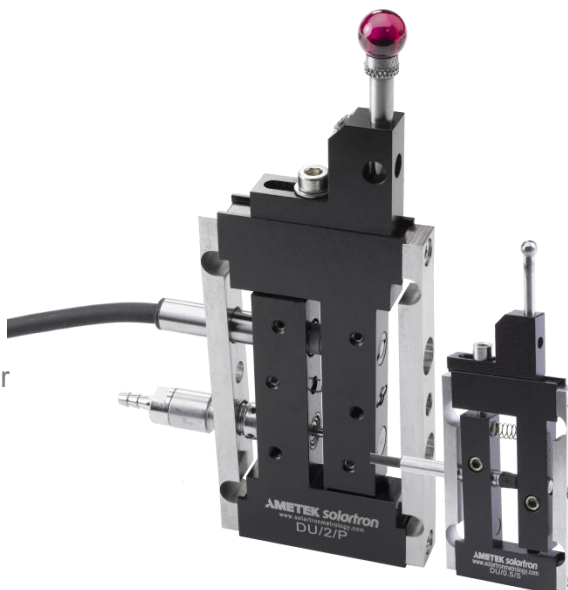
Note 1: Accuracy 0.1 µm or % reading (whichever greater) assumes 20 mm tip holder mounted on center, spring operation with standard springs. Offset tips, long arms etc may reduce performance.  
Note 2: Repeatablty is under the same conditions as accuracy

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## Digital Flexures

### Features

- Accuracy to  $<1 \mu\text{m}$  (0.00004 in)
- Excellent repeatability  $0.05 \mu\text{m}$  (0.000010 in)
- Measurement ranges 0.5 to 2 mm.
- Uses Orbit® 3 Digital Measurement System for
  - Fast data rates
  - Simple connectivity
  - Multiple sensors on one network
- Fully traceable calibration.



### Description

Ultra high resolution and excellent repeatability make Solartron's flexure transducers the first choice for high speed precision gauging.

With no sliding moving parts, the flexure will maintain performance for millions of cycles and are virtually free from hysteresis.

Flexures can be mounted such that there is little or no stress through the gauge line enabling precision profiling of moving materials such as rotating shafts, brake discs etc. With resolution better than  $0.05 \mu\text{m}$  at speeds up to 3906 readings per second the flexure with Orbit® 3 provides a great solution.

Other features include:

- Compact size
- Pneumatic or spring actuation for automatic gauges
- Large range of changeable tips
- IP65 Protection





## Digital Flexure Gauges: Technical Specification

Product	Parallel Flexures			Single Flexure
	4 mm wide	8 mm wide		
Axial Cable Outlet	DU/0.5	DU/1	DU/2	DUS/0.5
Radial Cable Outlet		DUR/1	DUR/2	
<b>Measurement Range (mm)</b>				
Measurement Range (±mm)	0.5	1	2	0.5 (Note3)
Accuracy (% of Reading) (Note 1)	0.1	0.1		0.1
Repeatability (µm) (Note 2)	<0.1	<0.1		<0.1
Resolution (µm)	0.01	0.01		0.01
Pre Travel (mm)	0.03/0.06	0.05/0.1		0.02/0.03
Post Travel (mm)	0.29	0.4		0.05/0.1
Tip Force (N) at Middle of Range ±20%				
Spring Push	0.5	1.5		1.25
Pneumatic at 2 bar	N/A	1		N/A
Temperture Coefficient (µm/°C)	0.5	0.5		0.5
<b>Environmental</b>				
Sealing for Probe	IP65 IP43 for module and TCON +5 to +80 -20 to +80 EN61000-6-3 EN61000-6-2			
Sealing for Probe Interface Electronics				
Probe Operating Temperature with Gaiter (°C)				
Storage Temperature (°C)				
EMC Emissions				
EMC Immunity				
<b>Material</b>				
Flexure Body	Stainless Steel and Aluminium Fluoroelastomer PUR ABS			
Gaiter				
Cable				
Electronics Module				
<b>Orbit®3 Interface Options</b>				
Reading Rate	3906 readings per second 460, 230, 115, 58, 29, 14, 7,4 5±0.25 VDC @ 0.06A typical			
Bandwidth of Electronics (Hz) user selectable				
Power				

Note 1: Accuracy 0.1  $\mu$ m or % reading (whichever greater) assumes 20 mm tip holder mounted on center, spring operation with standard springs. Offset tips, long arms etc may reduce performance.

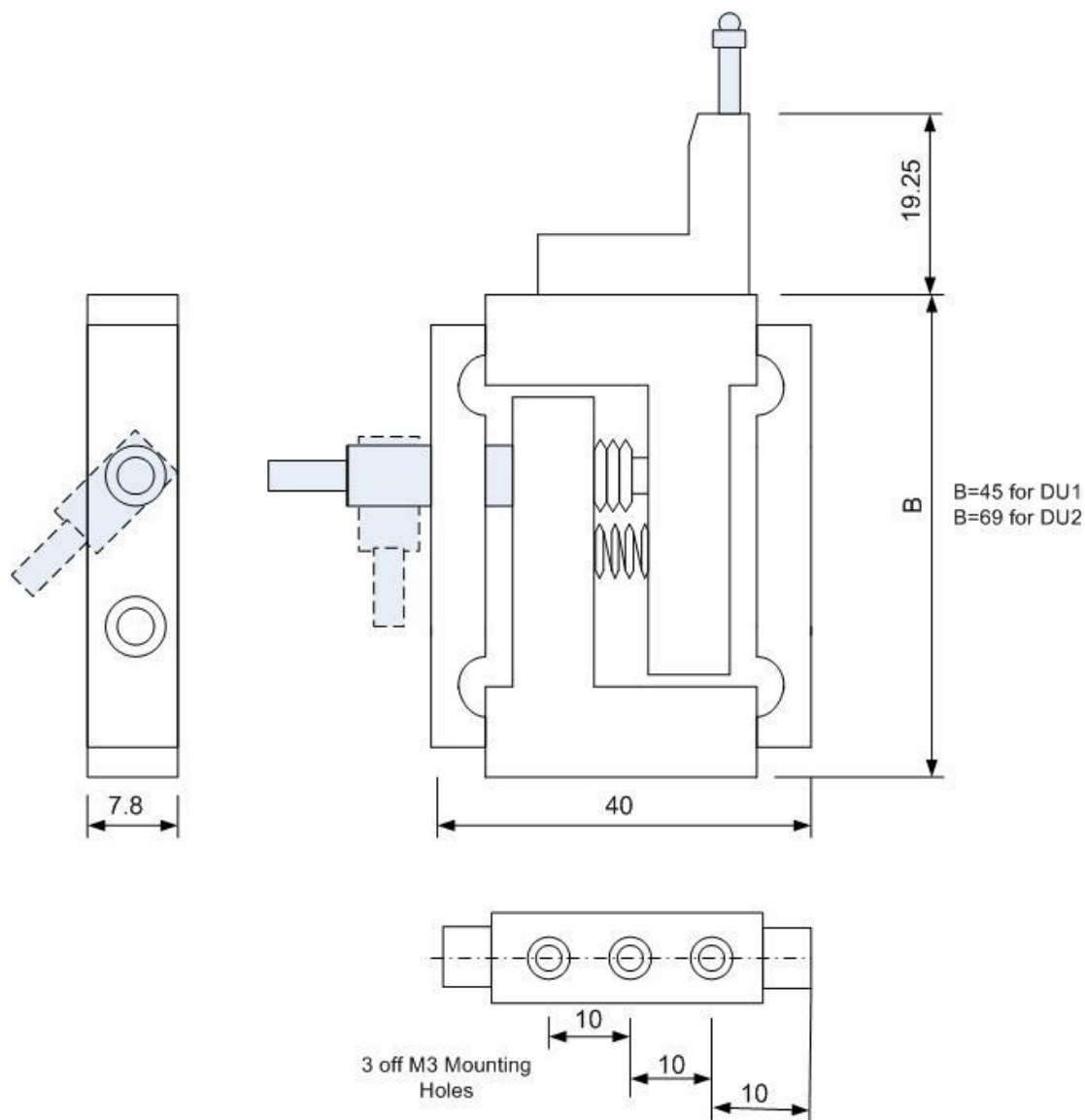
Note 2: Repeatability is dependent on the configuration of the tip and holder (see diagram in datasheet)

Note 3 : For Single Flexure range 50 mm from the flex point, extention arms will change this parameter

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## Digital Flexure Gauges: Dimensions

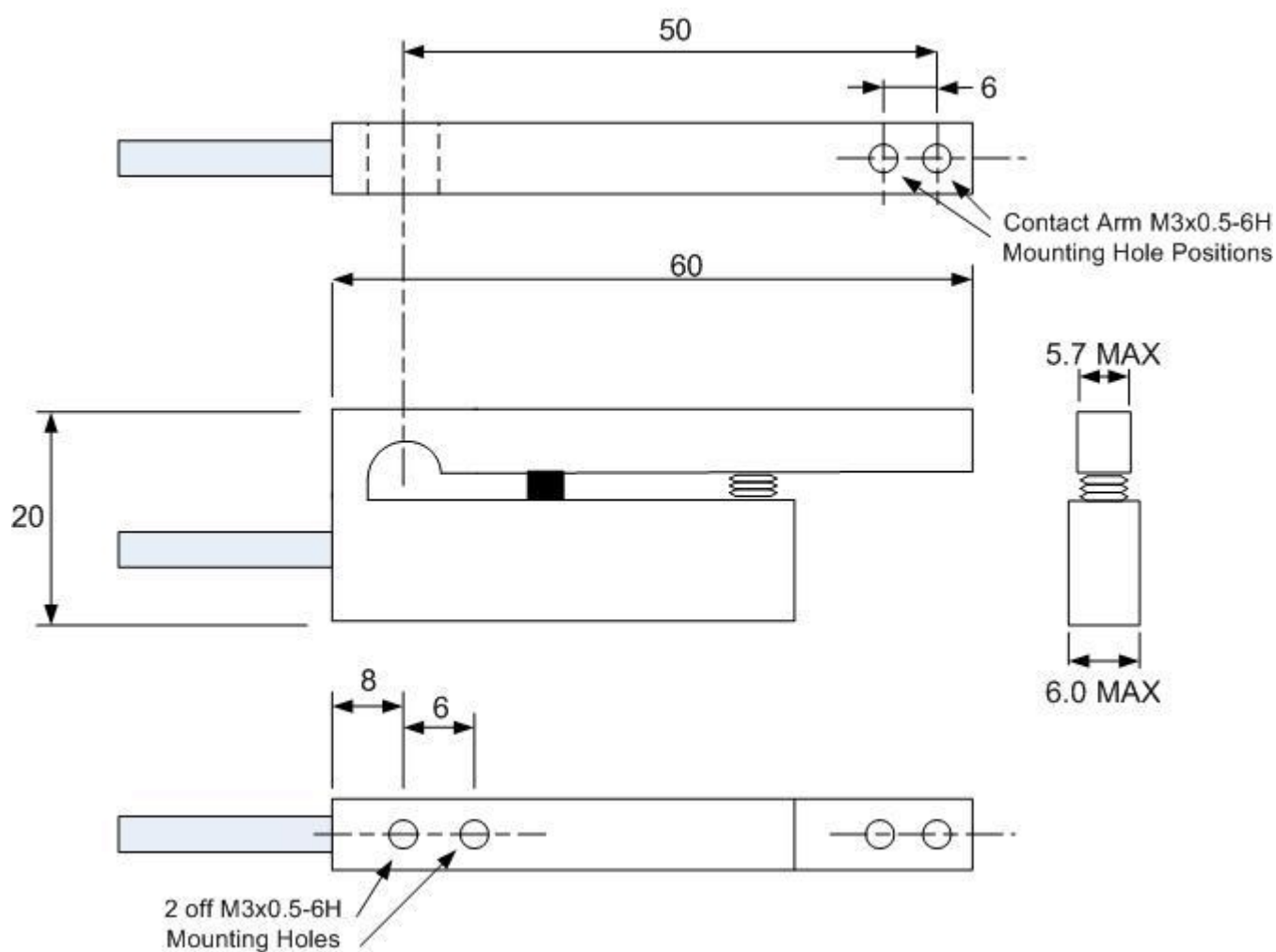


All Dimensions are nominal only for accurate drawings download the correct Sales Application Drawing from the Solartron Metrology Website



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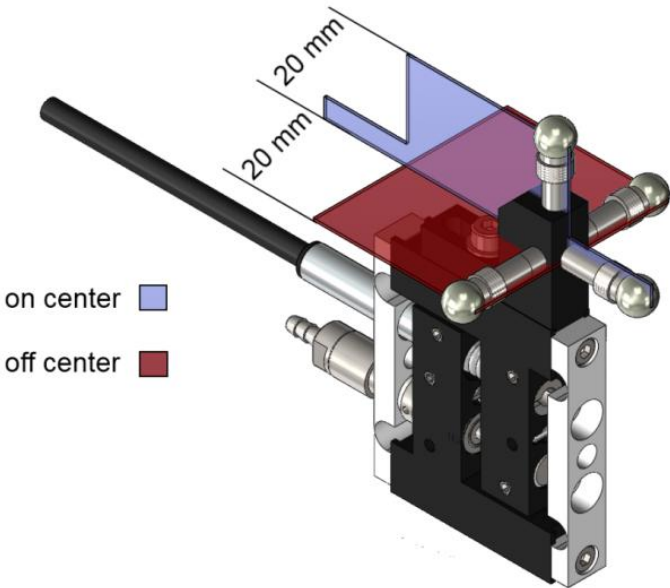
## Digital Flexure Gauges: Dimensions



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## Digital Flexure Gauges: Repeatability



Repeatability	DU/1 and DU/2
on center	< 0.1 $\mu\text{m}$
off center	< 0.5 $\mu\text{m}$

Note: Tips and Tip Holders can have a significant effect on repeatability, the specification applies to the above configurations only

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## Digital Mini Probe

### Features

- Accuracy to **<1  $\mu\text{m}$  (0.00004 in)**
- Excellent repeatability **0.05  $\mu\text{m}$  (0.000010 in)**
- Measurement ranges **0.5 to 1 mm**
- Uses **Orbit<sup>®</sup> 3** Digital Measurement System for
  - Fast data rates
  - Simple connectivity
  - Multiple sensors on one network
- Fully traceable calibration.

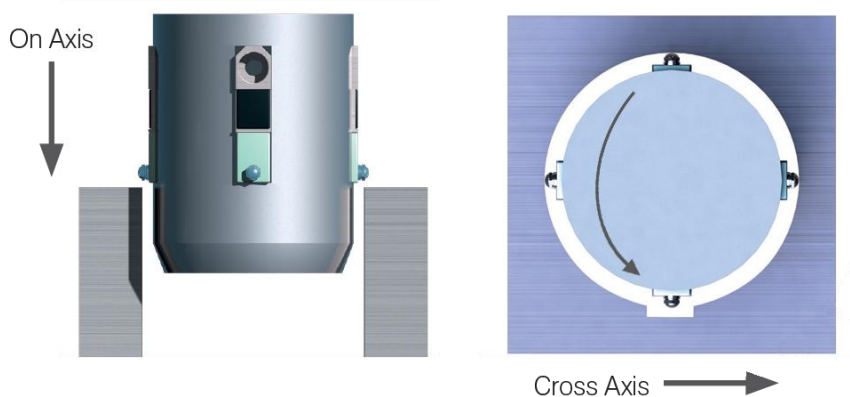


### Description

The Mini Probe is a compact, low profile transducer that is ideal for measurement in confined spaces, such as bores. The transducer is based on a parallel spring structure that ensures that it provides excellent repeatability over a long working life, even when rotated in bores that have key slots of lubrication ports.

A Tungsten Carbide contact tip is fitted as standard but a selection of customer replaceable tips with an M2 thread is available for special applications.

Repeatability depends on the alignment of the mini probe whether on axis or cross axis as shown below.





# Digital Mini Probe: Technical Specification

**Products**

Spring Push
-------------

DM/0.5/S	DM/1/S
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**Measurement Performance**

Measurement Range (mm)
Accuracy (% of Reading) (Note 1)
Repeatability (µm)
Range: 0-100 µm nominal
Range: 100-250 µm nominal
Range: 250-500 µm nominal
Range 500 - 1000 µm nominal
Resolution (µm)
Pre Travel (mm)
Post Travel (mm) (Min)
Tip Force (N) at Middle of Range ±20% Spring Push
Temperature Coefficient %FS/°C

0.5		1	
0.05		0.05	
On axis	Cross axis	On axis	Cross axis
0.1	0.1	0.1	0.1
0.25	0.15	0.1	0.1
0.5	0.25	0.15	0.15
N/A	N/A	0.3	0.2
<0.1		<0.1	
0.01/0.02		0.015/0.025	
0.07		0.07	
0.7		0.7	
0.08		0.08	

**Environmental**

Sealing for Probe
Sealing for Probe Interface Electronics
Storage Temperature (°C)
Probe Operating Temperature with Gaiter (°C)
Electronics Operating Temperature (°C)
EMC Emissions
EMC Immunity
Shock

IP50
IP43 for module and TCON
-20 to +80
+5 to +80
0 to 60
EN61000-6-3
EN61000-6-2
Do not subject to excessive shock - follow instructions when installing and adjusting

**Material**

Probe Body
Probe Tip (options)
Gaiter
Cable
Electronics Module

Steel
Ruby, Silicon Nitride, Tungsten Carbide
Fluroelastomer
PUR
ABS

**Electronics Interface (Orbit®3)**

Orbit®3 Interface Options
Reading Rate
Bandwidth of Electronics (Hz) user selectable
Power

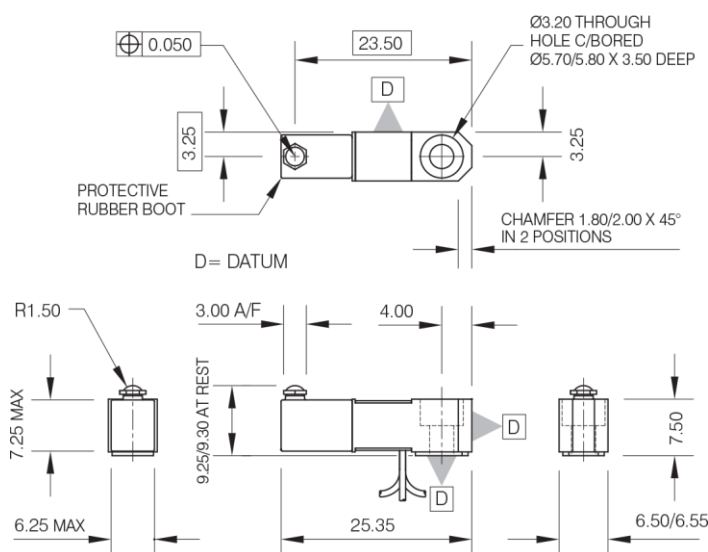
USB, Ethernet, RS232
3906 readings per second
460, 230, 115, 58, 29, 14, 7,4
5±0.25 VDC @ 0.06A typical

Note 1: Accuracy 0.1 µm or % reading whichever greater

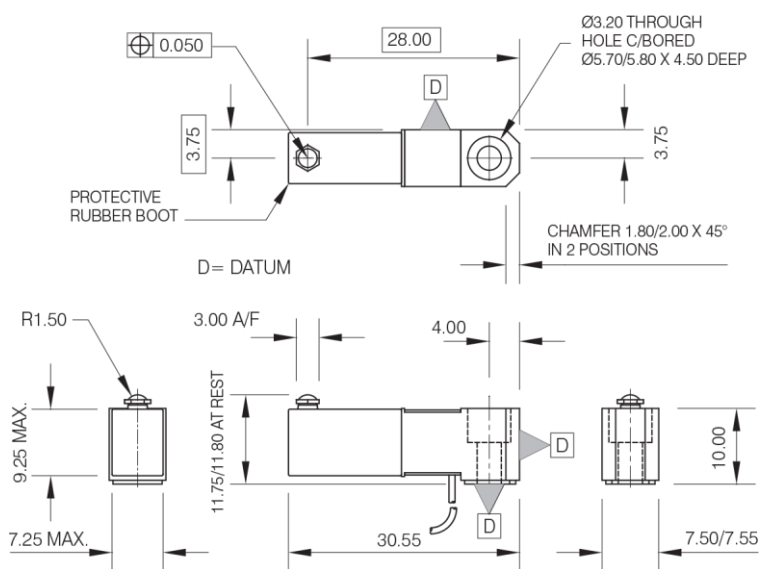
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## Digital Mini Probes: Dimensions

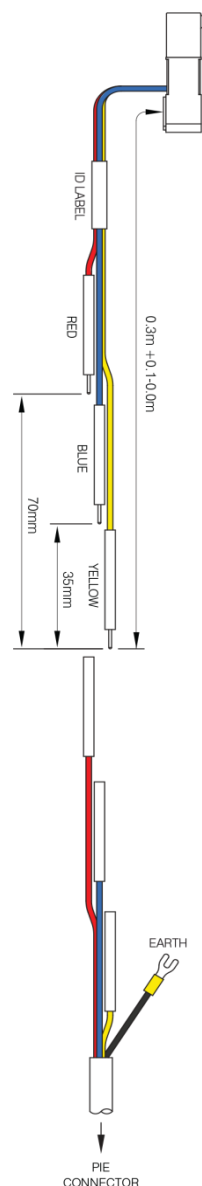
### DM/0.5/S



### DM/1/S



### Cable and Connections (other options available)



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orbit<sup>3</sup>

## Digital Lever Probe

### Features

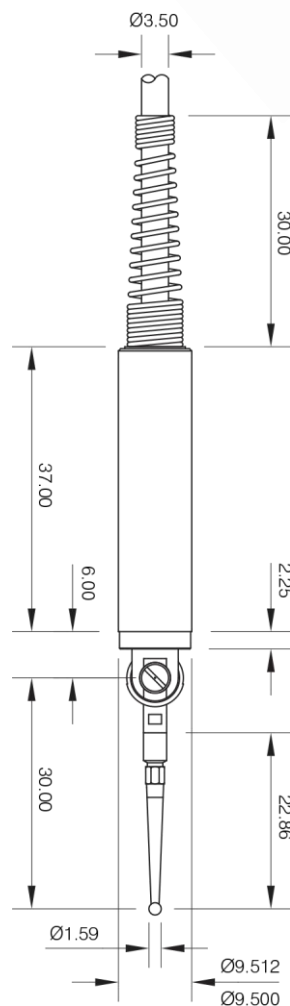
- Accuracy to **<2 µm (0.00004 in)**
- Excellent repeatability **0.05 µm (0.000010 in)**
- Measurement ranges **0.5 to 1 mm**.
- Uses **Orbit® 3** Digital Measurement System for
  - Fast data rates
  - Simple connectivity
  - Multiple sensors on one network
- Fully traceable calibration.

### Description

Solartron's Digital Lever Probe has been conceived for the precision measurement market. The probe is ideally suited to applications where the use of axial measuring probes is not possible, and where a low tip force and a high number of probing points are required. Its simple design and exceptional reliability result in a reduced cost of ownership without any reduction in performance.

Due to its cylindrical housing geometry, the Lever Probe can be mounted in any attitude relative to the intended target. It can be mounted via the use of 8 mm peg or industry standard dovetail mounting blocks, or clamped directly into a 9.52 mm mounting hole.

With a measurement range of 500 microns and repeatability below 0.15 micron, the Digital Lever Probe can be easily integrated into measurement systems using Solartron's Orbit® 3 Network.



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## Digital Lever Probe: Technical Specification

### Products

Spring Push

DL/0.5/S

### Measurement Performance

Measurement Range (mm)

0.5

Accuracy with measurement arm normal to the axis of stylus (μm)

1.2

Repeatability (μm)

On Axis

<0.15

Cross Axis

<0.3

Resolution (μm)

<0.01

Pre Travel (mm)

0.02/0.03

Post Travel (mm) (Min)

0.06

Tip Force (N) at Middle of Range ±20%  
Spring Push

0.05 to 0.2

Temperature Coefficient %FS/°C

0.01

### Environmental

Sealing for Probe Interface Electronics

IP43 for module and TCON

Storage Temperature (°C)

-20 to +80

Probe Operating Temperature (°C)

+5 to +80

Electronics Operating Temperature (°C)

0 to 60

EMC Emissions

EN61000-6-3

EMC Immunity

EN61000-6-2

Shock

Do not subject to shock or to excessive side loads

### Material

Probe Body

Probe Tip (options)

Stainless Steel

Available in diameters of 2.54mm,  
1.59mm, 0.79mm, 0.39mm mounting thread 1-74UNF

Cable

PUR

Electronics Module

ABS

### Electronics Interface (Orbit@3)

Orbit@3 Interface Options

Reading Rate

Bandwidth of Electronics (Hz) user selectable

Power

USB, Ethernet, RS232

3906 readings per second

460, 230, 115, 58, 29, 14, 7, 4

5±0.25 VDC @ 0.06A typical



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