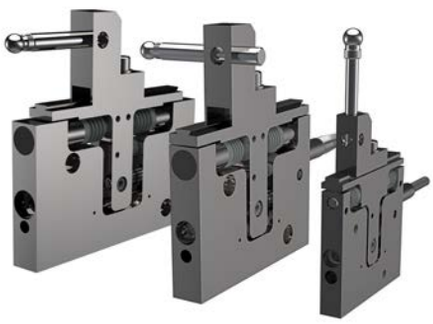
Orbit® Digital Specialist Transducers

Solartron's specialist gauging and measurement transducers are for applications where the standard pencil style probe will not fit.

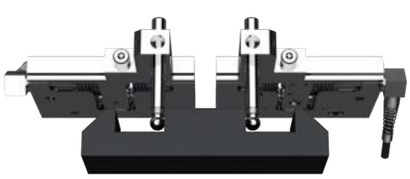


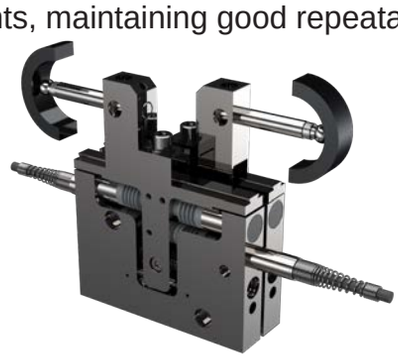
DK - Block Gauge

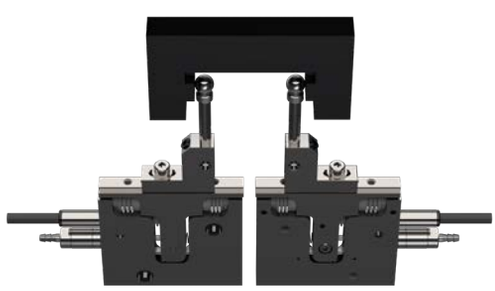
- Accuracy better than 1 µm
- Excellent Repeatability to 0.25 µm
- Measurement ranges of 2, 5 & 10 mm
- Spring or Pneumatic Actuation
- Multiple configurations with Top Tools and Tip holders

Solartron's Block Gauge make precision measurements of bores and cavities a simple and reliable process. More generally, the use of these devices is recommended in applications where space and access is limited and where the use of axial probes is not possible. The 2 mm Block Gauge is only 8 mm wide.

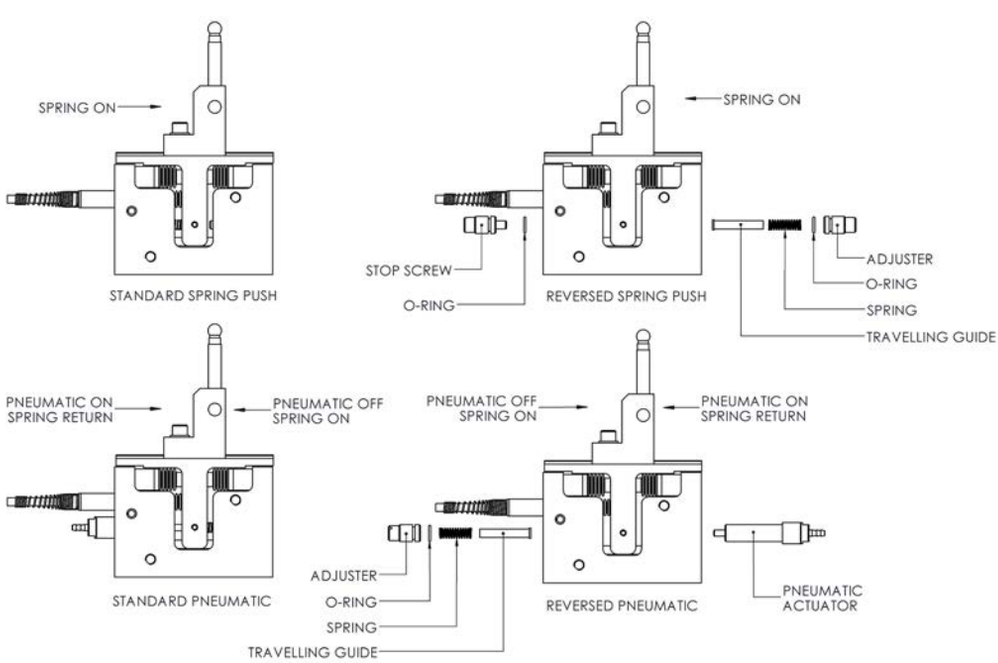
The Block Gauges offer unrivalled ruggedness, accuracy and repeatability. All three units are extremely versatile and provide datum surfaces and all the adjustments required for precision gauging applications. Block Gauges have robust precision linear bearings with minimal clearance, which limits unmeasured movements, maintaining good repeatability even when the contact tip is mounted off centre.







Spring and Pneumatic Configurations



Spring and Pneumatic kits enable the automatic loading of components. Pneumatic actuation coupled with a spring controls the tip force for accurate measurements.

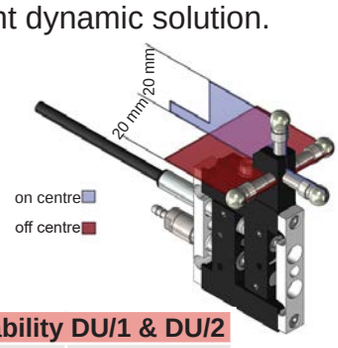
Orbit® Digital Specialist Transducers

DU - Flexures - Spring and Pneumatic

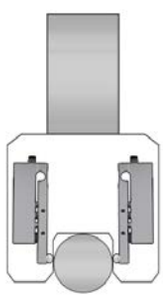
- 0.5, 1, and 2 mm ranges
- Width as thin as 4 mm (0.5 mm range)
- Accuracy better than 1 µm
- Repeatability to 0.05 µm
- Pneumatic or spring actuation (pneumatic 1 and 2 mm only)
- Removable leaves for ease of repair
- IP65 Protection

Parallel Flexures with 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 µm at speeds up to 3906 readings per second, the flexure with Orbit® provides an excellent dynamic solution.

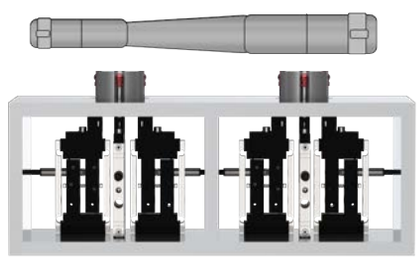


Repeatability DU/1 & DU/2	
On centre	< 0.1 µm
Off centre	< 0.5 µm



Application: Rod Diameter

Application: Bearing Check



Application: Connecting Rod

DUS - Single Leaf Flexures

- 0.5 mm range
- Spring actuation
- Normal or reverse actions
- Extension arms
- IP65 Protection

With the same advantages as the parallel flexure 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.

Block Gauge and Flexure Accessories

Tips (see page 40)
Standard M2.5 thread

Tips carriers
4 mm Ø, choice of 20, 30, 40 mm length (all). 6 mm Ø, choice of 20, 30, 40 mm length (5 & 10 mm block gauges only)

Tool holders
4 mm bore (all) 6 mm (5 & 10 mm block gauges only)

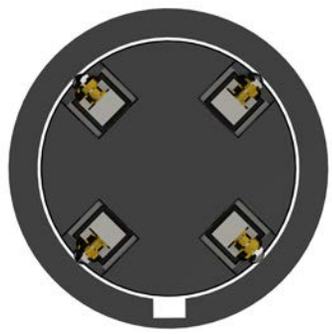
Pneumatic Actuators
3mm hose Ø nozzle fitted as standard. Can accept M5 threaded commercial couplings

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

Orbit® Digital Specialist Transducers

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



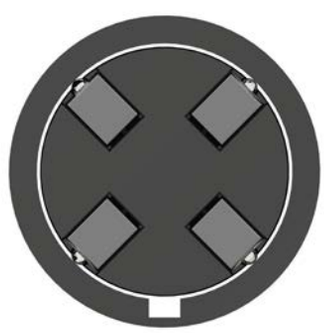
The Miniature Single Leaf Flexure is another variant of the flexure based contact probes. The miniature single leaf flexure has a calibrated range of 0 – 500 microns and provides the means for alternative configurations of contact tip mounting.

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 1 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, a range of 833 microns is achieved but a reading of only 500 microns is observed.

DM - Mini Probe

- Accuracy better than 1 µm
- Measurement ranges 0.5 and 1 mm
- Spring Actuation



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 excellent repeatability over a long working life, even when rotated in bores that have key slots or 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 in the diagram.

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Orbit® Digital Specialist Transducers

DL - Lever Probe

- Accuracy better than 3 µm
- Measurement range 0.5 mm
- Spring Actuation
- 2 g to 20 g tip force

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. It's simple design and exceptional reliability result in a reduced cost of ownership without any reduction in performance.

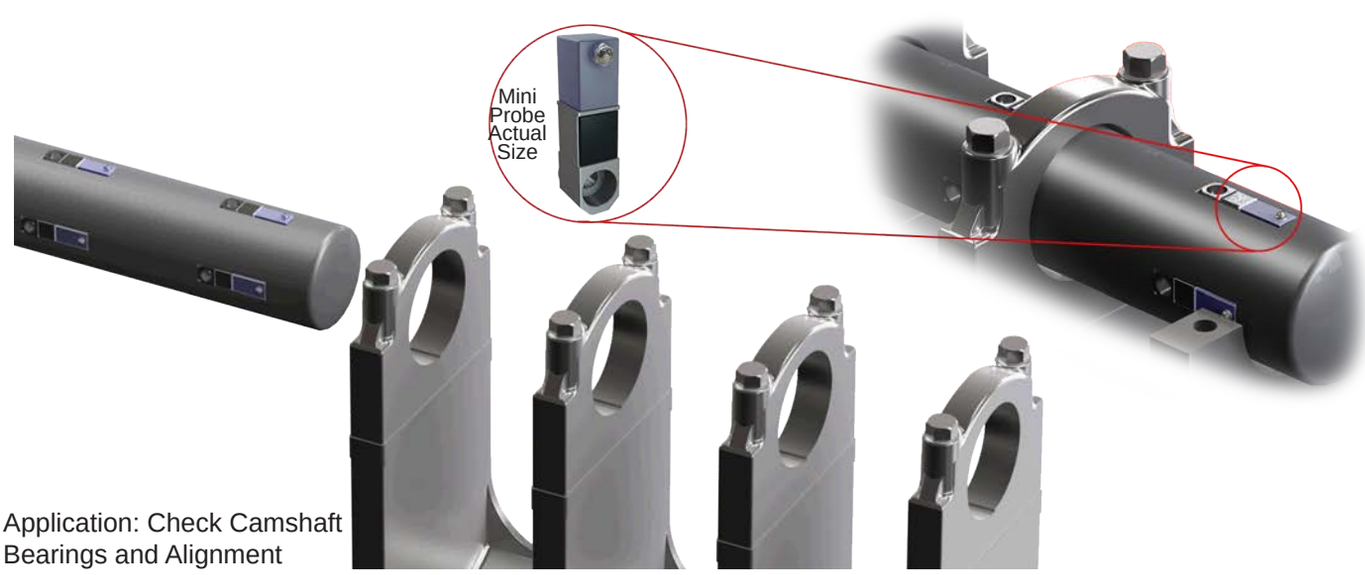
Due to it's cylindrical housing geometry, the Lever Probe can be mounted in any attitude relative to the intended target, although the stylus motion must be normal to the intended measurement.

Lever probe mounting blocks and styli

Ball Ø
0.38
0.79
1.59
2.54

Dovetail Mounting

8 mm peg mounting block



Application: Check Camshaft Bearings and Alignment

Orbit® Digital Specialist Transducers

	Block Gauges			Lever	
Axial Cable Outlet	DK/2	DK/5	DK/10	DL/0.5/S	
Radial Cable Outlet	DKR/2	DKR/5	DKR/10	N/A	
Product Body Width (mm)	8	12		9.5	
Measurement Performance					
Measurement Range (mm) (Note 3)	2	5	10	0.5	
Accuracy (% of Reading) (Note 1)	0.05	0.05	0.08	1.2 (Note 5)	
Repeatability (µm) (Note 2)	<0.25	<0.25	<0.5	On Axis	Cross Axis
Range:0-100 µm nominal	N/A	N/A	N/A	N/A	N/A
Range:100-250 µm nominal	N/A	N/A	N/A	N/A	N/A
Range:500-1000 µm nominal	N/A	N/A	N/A	<0.15	<0.3
Range:250-500 µm nominal	N/A	N/A	N/A	N/A	N/A
Resolution (µm)	0.01	0.05	0.05	<0.1	
Pre Travel (mm)	0.15	0.15	0.15	0.02/0.03	
Post Travel (mm)	0.85	0.85	0.85	0.06	
Tip Force (N) at Middle of Range ±20% (Horizontal)					
Spring Push	1.5	1.5	1.5	0.05-0.2	
Pneumatic at 2 bar		Note 6		N/A	
Temperature Coefficient (µm/ºC)	0.2	0.5	1	0.1	
Environmental					
Sealing		IP65		IP43	
Sealing for Probe Interface Electronics					
Storage Temperature (ºC)					
Block Gauge Operating Temperature (ºC)					
Electronics Operating Temperature (ºC)					
EMC Emissions					
EMC Immunity					
Shock	Do not subject Block Gauge to excessive shocks. This may damage the bearings.				
Material					
Block Gauge Body	Stainless Steel				
Probe Tip (options) (Note 4)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide			Tungsten Carbide	
Gaiter	Fluoroelastomer or Silicon				
Cable					
Electronics Module					
Electronics Interface (Orbit®)					
Orbit® Interface Options				USB, Ethernet®,	
Reading Rate					
Bandwidth of Electronics (Hz) user selectable					
Power					

- Note 1: Accuracy 0.1 µm or % whichever greater, assume 20 mm arm for block gauges and Applicable Parallel Flexures
- Note 2: Repeatability for Flexures depends on the configuration of the tip and holder - see diagram
- Note 3: DU/0.5/S - Range is at 50 mm from flex point, extension arms will multiply this parameter, for DUSM range is with no extension arm fitted
- Note 4: Lever Probe has tips in diameters of 2.54 mm, 1,59 mm, 0.79 mm, 0.38 mm mounting thread 1-72 UNF
- Note 5: Lever Probe accuracy with arm normal to axis of the stylus
- Note 6: Block gauge tip force is dependent on mounting attitude and spring for the pneumatic block gauge it is also air pressure and balancing spring combination

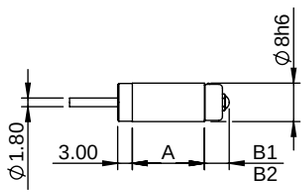
Technical Specifications

	Parallel Flexures						Single Flexures	
	DM/0.5/S		DM/1/S		DU/0.5/S	DU/1/S DUR/1/S	DU/2/S DUR/2/S	DUS/0.5/S	DUSM/0.5/S
	N/A		N/A		N/A			N/A	N/A
	6.5		7.5		4	8		6	8.5
	0.5		1		0.5	1	2	0.5	0.5
	0.05		0.05		0.10	0.10	0.10	0.10	0.05
	On Axis	Cross Axis	On Axis	Cross Axis	<0.1	<0.1	<0.1	<0.1	0.5
	0.10	0.10	0.10	0.10	N /A	N/A	N/A	N/A	N/A
	0.25	0.15	0.10	0.10	N/A	N/A	N/A	N/A	N/A
	0.5	0.25	0.15	0.15	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	0.3	0.2	N/A	N/A	N/A	N/A	N/A
	<0.1		<0.1		0.01	0.01	0.01	0.01	<0.1
	0.01/0.02		0.015/0.025		0.03/0.06	0.05/0.1	0.05/0.1	0.02/0.03	0.01/0.02
	0.07		0.07		0.29	0.4	0.4	0.05/0.1	0.07
	0.85		0.85		0.5	1.5	1.5	1.25	0.8 ±50%
	N/A				N/A	1	1	N/A	N/A
	0.08		0.8		0.5	0.5	0.5	0.5	0.1
	IP60				IP65			IP65	IP68
	IP43 for module and TCON								
	-20 to +80								
	+5 to +80								
	0 to 60								
	EN61000-6-3								
	EN61000-6-2								
.	Do not subject any flexure products to excessive loads, follow instructions when adjusting								
	Nylon, Ruby, Silicon Nitride, Tungsten Carbide								
	Fluoroelastomer							Fluoroelastomer	
	PUR								
	ABS								
	RS232, R5485, Modbus®, EtherNet/IP®, Bluetooth™, Profinet®, EtherCat®								
	3906 Readings per second								
	460, 230, 115, 58, 29, 14, 7, 4								
	5±0.25 VDC @ 0.06 A typical								

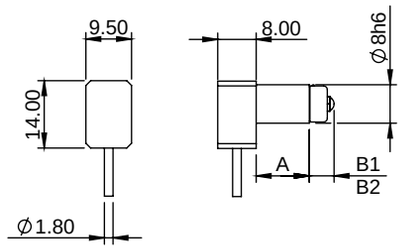
Orbit® Transducer Dimensions

Ultra Short Spring Push (DZ/S)

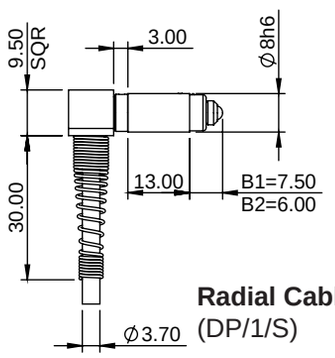
	DZ/1/S	DZ/2/S	DZR/1/S	DZR/2/S
A	15.00	19.50	11.00	15.50
B1	5.15	6.25	5.15	6.25
B2	3.65	3.65	3.65	3.65



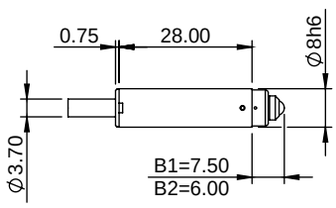
Radial Cable Outlet (DZR/S)



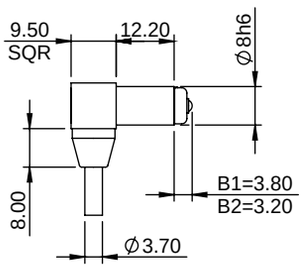
Miniature Spring Push (DP/0.5/S & DP/1/S)



Radial Cable Outlet (DP/1/S)



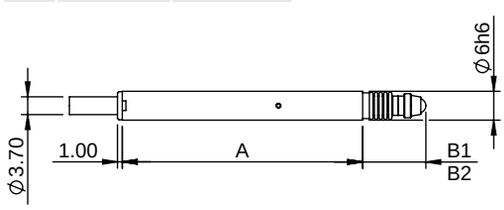
Axial Cable Outlet (DP/1/S)



Radial Cable Outlet (DP/0.5/S)

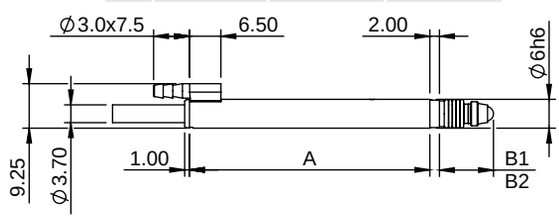
6 mm Diameter Body Spring Push (D6P/S)

	D6P/2/S	D6P/5/S
A	50.00	74.00
B1	14.30	29.50
B2	11.80	23.50

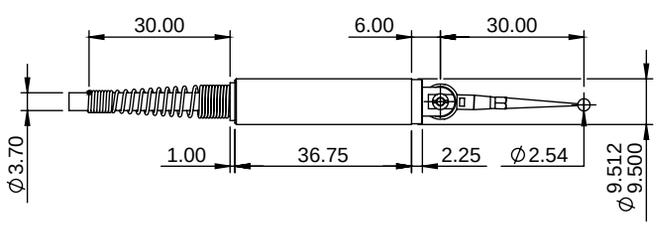


6 mm Diameter Body Gaiter Independent Pneumatic (D6J/P)

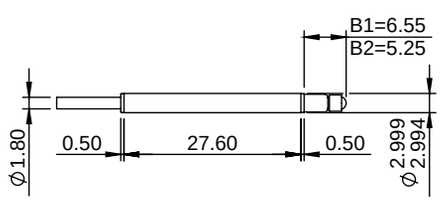
	D6J/2/P	D6J/5/P	D6J12P
A	50.00	80.00	87.00
B1	14.00	30.00	37.00
B2	11.00	24.00	24.00



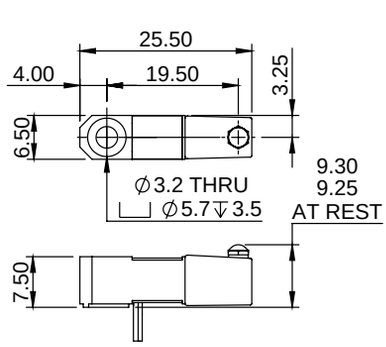
Lever Probe (DL)



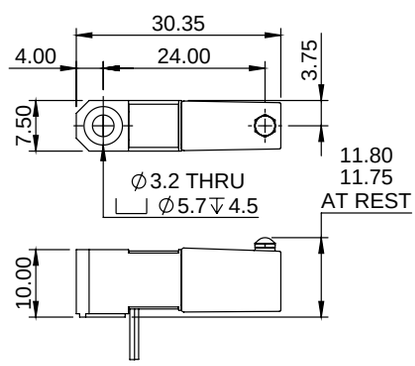
3 mm Diameter Body (D3P/S)



Mini Probe (DM)

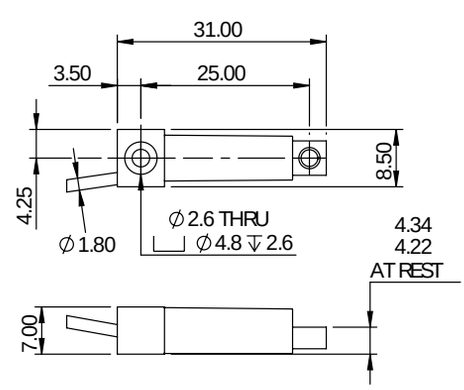


(DM/0.5/S)



(DM/1/S)

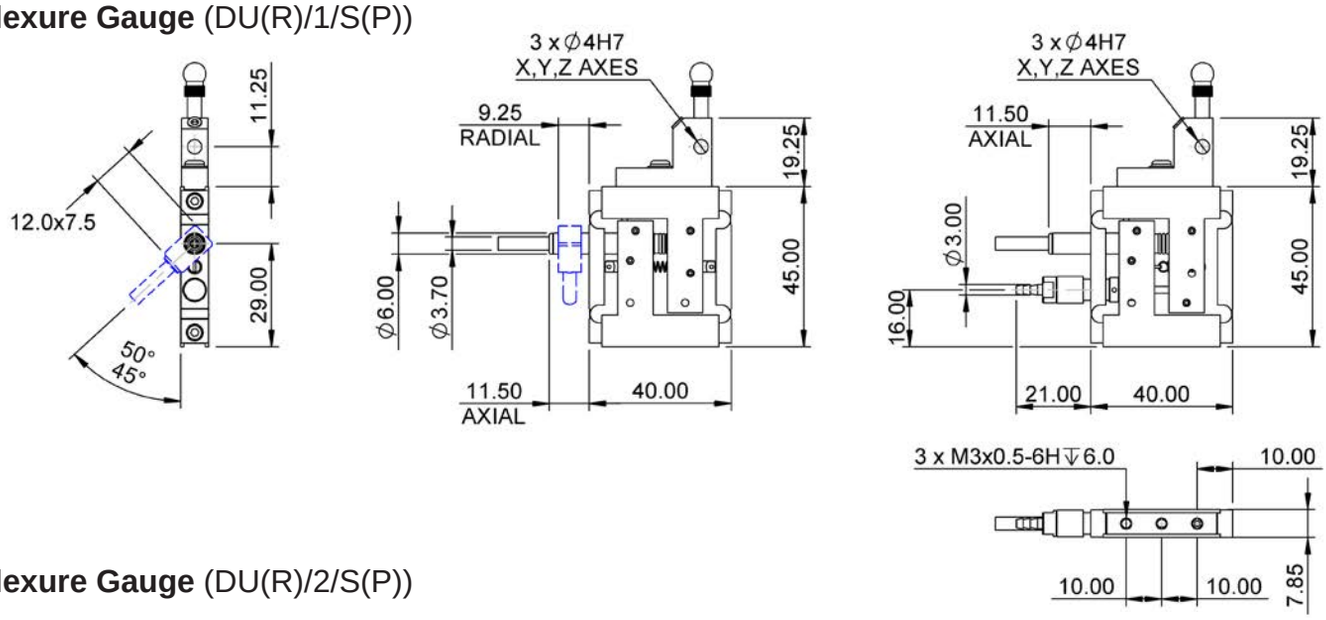
Mini Single Leaf Flexure (DUSM)



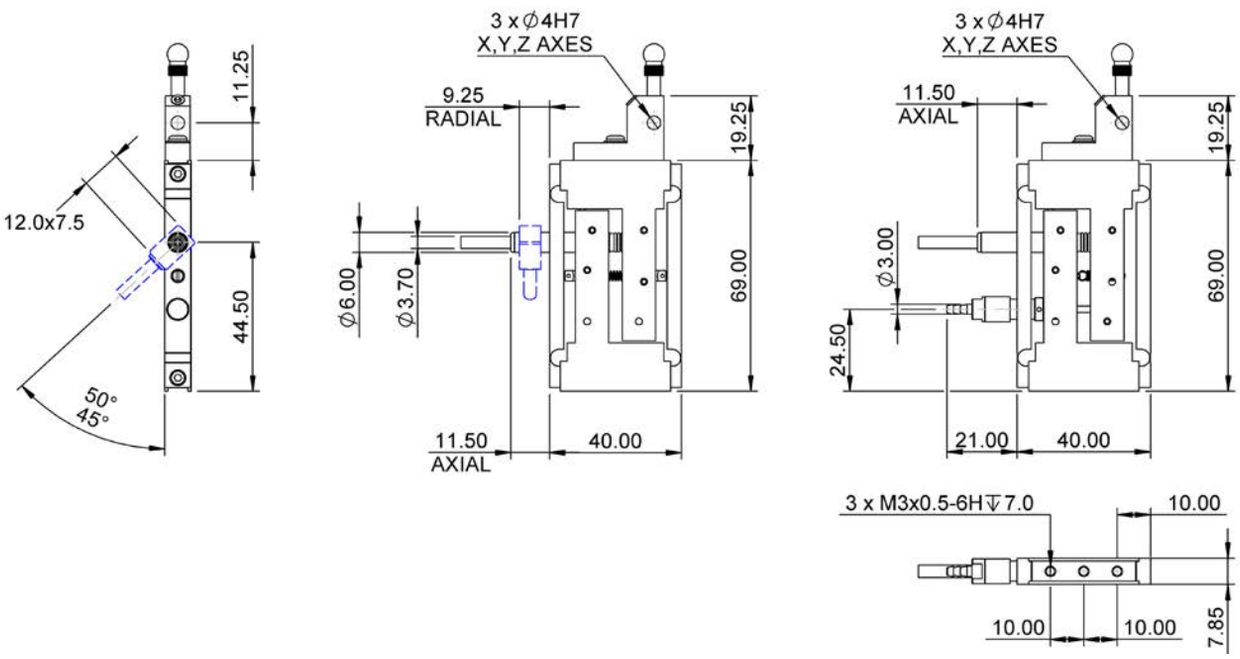
(DUSM/0.5/S)

Orbit® Transducer Dimensions

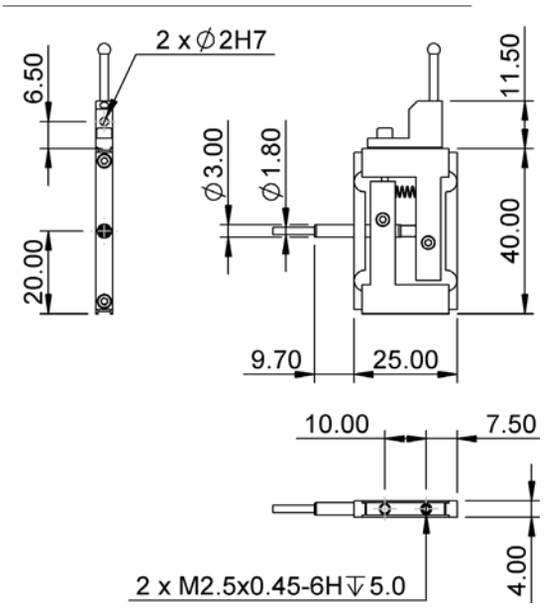
Flexure Gauge (DU(R)/1/S(P))



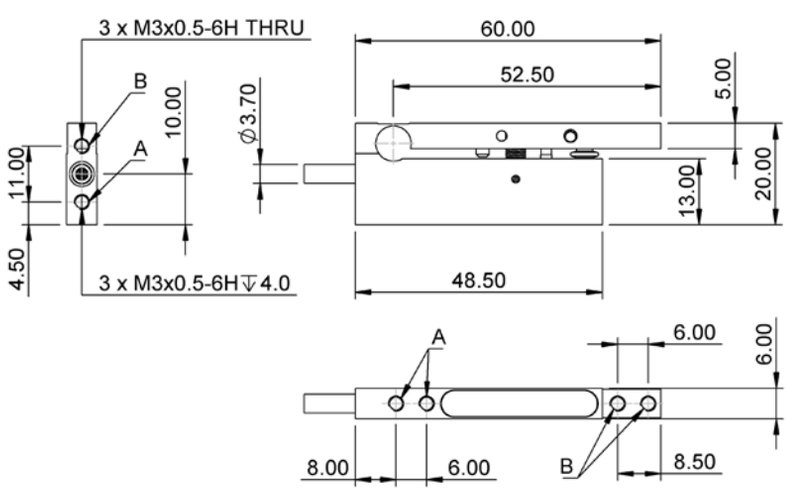
Flexure Gauge (DU(R)/2/S(P))



Miniature Flexure Gauge (DU/0.5/S)

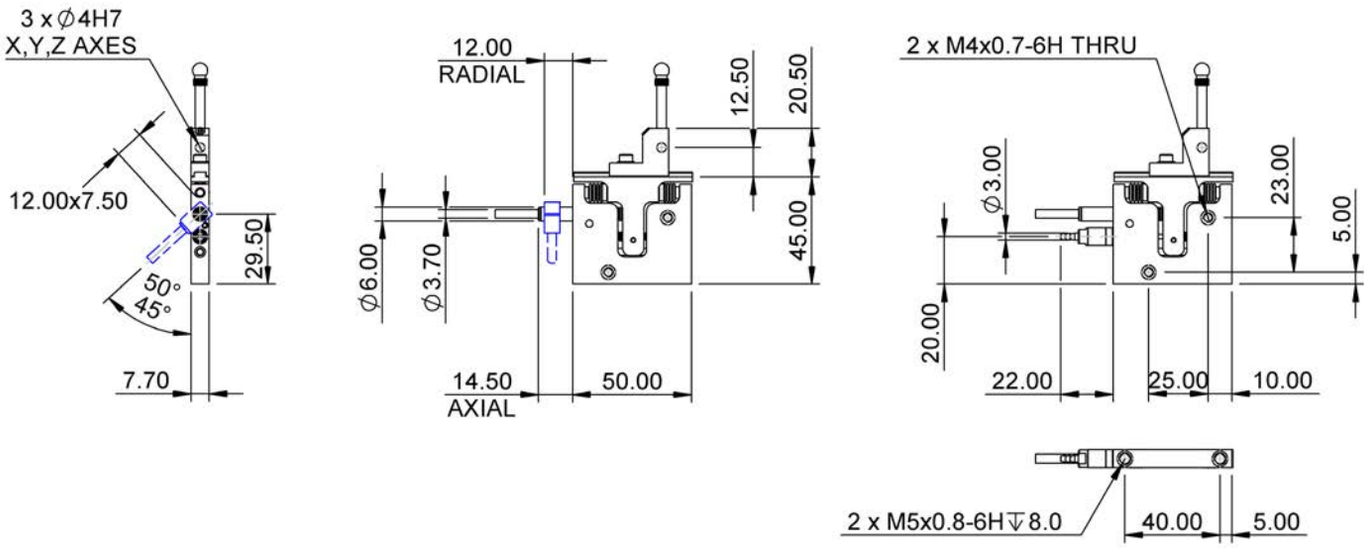


Single Leaf Flexure (DUS/0.5/S)

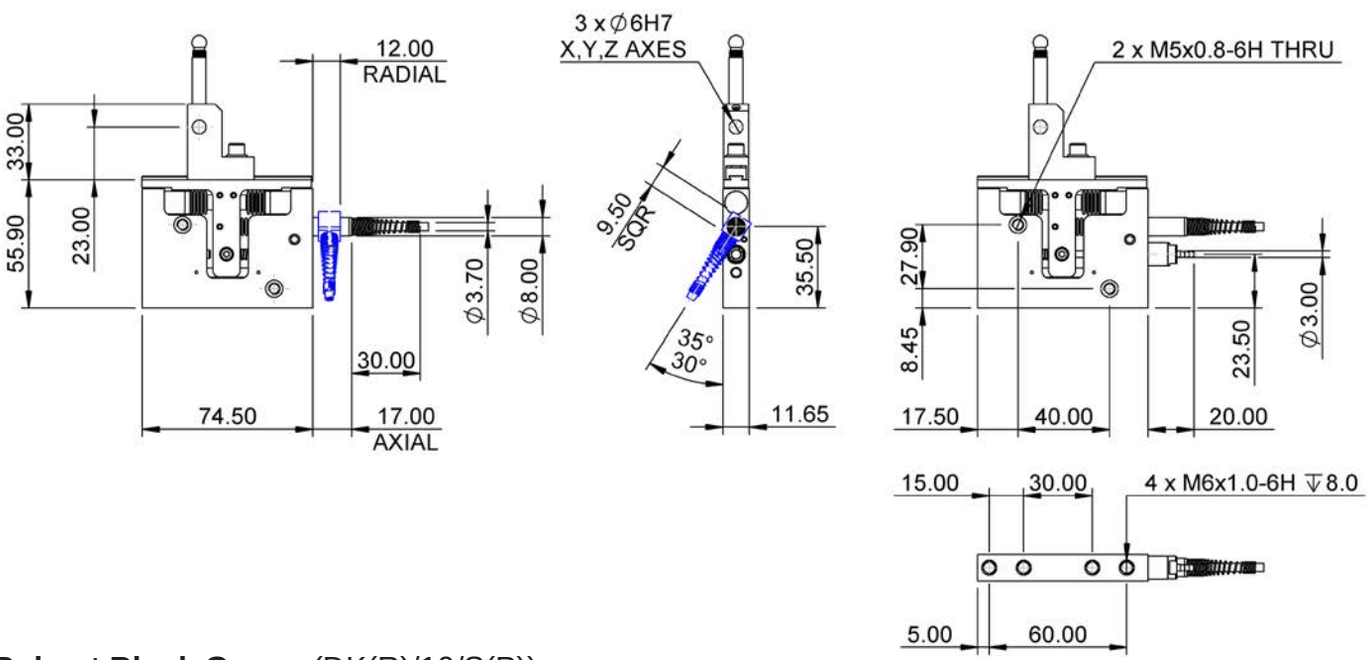


Orbit® Transducer Dimensions

Block Gauge (DK(R)/2/S(P))



Robust Block Gauge (DK(R)/5/S(P))



Robust Block Gauge (DK(R)/10/S(P))