

# Analogue Gauging

Solartron Analogue Contact Gauging Sensors provide a cost effective solution over a wide range of industrial and laboratory measurement applications.

The standard analogue gauging sensors utilize precision linear bearings and an anti-rotation mechanism to ensure long life. Measurement ranges are from  $\pm 0.25$  to  $\pm 10$  mm. For applications with harder to reach features, Solartron offers a variety of compact and small diameter sensors, along with specialized probes such as Block gauges and Flexures. The sensors can also be customized with Right Angle outlets and steel braided cables.

Built in the UK with state of the art equipment and an attention to detail, Solartron gauging sensors have a rugged build that maintains high resolution through tens of millions of cycles. Users consider them an investment, not a cost.

- Spring push, pneumatic or vacuum retract
- Specialist sensors with parallel guiding – Block and Flexures
- Precision linear bearings
- Wide offering of measurement ranges
- Linearity better than 0.5% of reading
- Repeatability of  $0.15 \mu\text{m}$
- Available in 6 mm and 8 mm body diameter.



## Precision. Quality. Reliability

[www.solartronmetrology.com](http://www.solartronmetrology.com) • [sales.solartronmetrology@ametek.com](mailto:sales.solartronmetrology@ametek.com)

## Gauging Probes: Spring push

### Standard - AX



The Standard AX range of Spring Push Probes has justifiably become the workhorse of the gauging industry. Excellent linearity and repeatability, long life precision bearings, and an IP65 rating ensure that probes maintain their performance for millions of cycles.

- Rugged design with IP 65 rating
- 0.7 N Tip force
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- Tested to 13 million cycles
- Excellent linearity and repeatability

### Vacuum retract



The vacuum retract probe allows the number of moving parts in a fixture to be reduced, resulting in improved reliability and reduced fixture costs. It also enables fast and safe automatic loading of the component into a gauge when required.

- Rugged design with IP 65 rating
- 0.7 N Tip force
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- Tested to 13 million cycles
- Excellent linearity and repeatability

### Feather Touch – AT



With very low tip forces, 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.

- As low as 0.18 N Tip force
- Ideal for glass, electronics, and delicate surfaces
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- Nylon and ruby tips available

### Ultra Feather Touch - AW



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.

- Low 0.03 to 0.06 N tip force
- Ideal for delicate surfaces
- $\pm 5$  mm range
- Not ideal for side load applications

Spring Push		LVDT	HB	LVDT	HB	LVDT	HB	LVDT	HB
Axial Cable Outlet :	Standard Spring	A6G/1/S	A6G/1/SH	-	-	AX/0.5/S	AX/0.5/SH	AX/1/S	AX/1/SH
	Vacuum	-	-	-	-	-	-	AX/1/V	AX/1/VH
	Feather Touch	-	-	-	-	AT/0.5/S	AT/0.5/SH	AT/1/S	AT/1/SH
	Ultra feather Touch	-	-	-	-	-	-	-	-
Radial Cable Outlet :	Standard Spring	-	-	AXR/0.25/S	AXR/0.25/SH	AXR/0.5/S	AXR/0.5/SH	AXR/1/S	AXR/1/SH
	Vacuum	-	-	-	-	-	-	AXR/1/V	AXR/1/VH
	Feather Touch	-	-	-	-	-	-	ATR/1/S	ATR/1/SH
	Ultra feather Touch	-	-	-	-	-	-	-	-
Measurement Performance									
Measurement Range (mm)		±1		±0.25		±0.5		±1	
Accuracy (% of reading or µm) 1				0.5 or 0.5 µm		0.5 or 0.5 µm		0.5 or 1 µm	
Repeatability (µm) 2		0.15		0.1		0.15		0.15	
Resolution		Dependent on associated electronics							
Pre-Travel (mm)		0.15		0.03		0.15		0.15	
Post-Travel (mm)		0.35		0.05		0.35		0.85	
Tip Force (N) at Middle of Range (±20%)									
Spring Push Standard/Vacuum		0.7		0.7		0.7		0.7	
Spring Push Feather Touch		-		-		0.4		0.3	
Spring Push Ultra Feather Touch		-		-		-		-	
Temperature Coefficient %FS/°C				0.03		0.03		0.01	
Electrical Interface									
Energising Voltage		1 to 10 Vrms							
Energising Current (mA/V ± 5%)		3	1.2	3	1.2	2.2	1.2	1.8	1
Sensitivity (mV/V/mm± 5%) Plugged		200	73.5	200	73.5	200	73.5	200	73.5
Sensitivity (mV/V/mm± 5%) Unplugged		269	88	262	82	262	82	210	83
Mechanical									
Body Diameter (mm)		6h6		8h6					
Case		Stainless Steel							
Probe Tip (options)		Nylon, Ruby, Silicon Nitride, Tungsten Carbide							
Gaiter		Fluoroelastomer or Silicon							
Cable		PUR							
Environmental									
Sealing For Probe		IP65 with gaiter or IP50 without gaiter							
Storage Temp (°C)		-20 to +70							
Operating Temp With Gaiter (°C)		+5 to +80							
Operating Temp Without Gaiter (°C)		-10 to +80							

1: Accuracy µm or % reading, whichever is the greater

2: Obtained by repeated operation against a tungsten carbide target

Spring Push	LVDT	HB	LVDT	HB	LVDT	HB	LVDT	HB
Axial Cable Outlet : Standard Spring	AX5/1/S	AX5/1/SH	AX/1.5/S	AX/1.5/SH	AX/2/S	AX/2/SH	AX5/2/S	AX5/2/SH
Vacuum	AX5/1/V	AX5/1/VH	AX/1.5/V	AX/1.5/VH	AX/2/V	AX/2/VH	-	-
Feather Touch	-	-	AT/1.5/S	AT/1.5 /SH	AT/2/V	AT/2/SH	-	-
Ultra feather Touch	-	-	-	-	-	-	-	-
Radial Cable Outlet : Standard Spring	AXR5/1/S	AXR5/1/S	AXR/1.5/S	AXR/1.5/SH	AXR/2/S	AXR/2/SH	AXR5/2/S	AXR5/2/S
Vacuum	AXR5/1/V	AXR5/1/VH	AXR/1.5/V	AXR/1.5/SH	-	-	-	H
Feather Touch	-	-	ATR/1.5/S	ATR/1.5 /SH	-	-	-	-
Ultra feather Touch	-	-	-	-	-	-	-	-
Measurement Performance								
Measurement Range (mm)	±1		±1.5		±2		±2	
Accuracy (% of reading or µm) 1	0.5 or 1.5 µm		0.5 or 1.0 µm		0.5 or 2.5 µm		0.5 or 2.0 µm	
Repeatability (µm) 2	0.15		0.15		0.15		0.15	
Resolution	Dependent on associated electronics							
Pre-Travel (mm)	0.15		0.15		0.15		0.15	
Post-Travel (mm)	8.85		0.85		1.35		9.85	
Tip Force (N) at Middle of Range (±20%)								
Spring Push Standard/Vacuum	0.7		0.7		0.7		0.7	
Spring Push Feather Touch	0.3		0.3		-		-	
Spring Push Ultra Feather Touch	-		-		-		-	
Temperature Coefficient %FS/°C	0.01		0.01		0.01		0.01	
Electrical Interface								
Energising Voltage	1 to 10 Vrms							
Energising Current (mA/V ± 5%)	1.8	1	2	1	2	1	2	1
Sensitivity (mV/V/mm± 5%) Plugged	200	73.5	133	49	80	29.4	80	29.4
Sensitivity (mV/V/mm± 5%) Unplugged	210	83	150	82	150	82	150	82
Mechanical								
Body Diameter (mm)	8h6							
Case	Stainless Steel							
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide							
Gaiter	Fluoroelastomer or Silicon							
Cable	PUR							
Environmental								
Sealing For Probe	IP65 with gaiter or IP50 without gaiter							
Storage Temp (°C )	-20 to +70							
Operating Temp With Gaiter (°C)	+5 to +80							
Operating Temp Without Gaiter (°C)	-10 to +80							

**1:** Accuracy µm or % reading, whichever is the greater

**2:** Obtained by repeated operation against a tungsten carbide target

Spring Push	LVDT	HB	LVDT	HB	LVDT	HB
Axial Cable Outlet : Standard Spring Vacuum Feather Touch Ultra feather Touch	AX/2.5/S AX/2.5/V AT/2.5/S -	AX/2.5/SH AX/2.5/VH AT/2.5/SH -	AX/5/S AX/5/V AT/5/S AW/5/S	AX/5/SH AX/5/VH AT/S/SH AW/5/SH	AX/10/S AX/10/V AT/10/S -	AX/10/SH AX/10/VH AT/10/SH -
Radial Cable Outlet : Standard Spring Vacuum Feather Touch Ultra feather Touch	AXR/2.5/S AXR/2.5/V ATR/2.5/S -	AXR/2.5/SH AXR/2.5/VH ATR/2.5/SH -	AXR/5/S AXR/5/V ATR/5/S AW/5/S	AXR/5/SH AXR/5/VH ATR/S/SH AW/5/SH	AXR/10/S AXR/10/V ATR/10/S -	AXR/10/SH AXR/10/VH ATR/10/SH -
Measurement Performance						
Measurement Range (mm)	±2.5		±5		±10	
Accuracy (% of reading or µm) <b>1</b>	0.5 or 2.5 µm		0.5 or 5 µm		0.7 or 10 µm	
Repeatability (µm) <b>2</b>	0.15		0.15		0.25	
Resolution	Dependent on associated electronics					
Pre-Travel (mm)	0.15		0.15		0.15	
Post-Travel (mm)	0.85		0.85		0.85	
Tip Force (N) at Middle of Range (±20%)						
Spring Push Standard/Vacuum	0.7		0.7		0.7	
Spring Push Feather Touch	0.3		0.3		0.3	
Spring Push Ultra Feather Touch	-		0.06		-	
Temperature Coefficient %FS/°C	0.01		0.01		0.01	
Electrical Interface						
Energising Voltage	1 to 10 Vrms					
Energising Current (mA/V ± 5%)	2	1	2	1.2	1	1.2
Sensitivity (mV/V/mm± 5%) Plugged	80	29.4	40	14.7	20	7.35
Sensitivity (mV/V/mm± 5%) Unplugged	150	82	105	51	33	33
Mechanical						
Body Diameter (mm)	8h6					
Case:	Stainless Steel					
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide					
Gaiter	Fluoroelastomer or Silicon					
Cable:	PUR					
Environmental						
Sealing For Probe	IP65 with gaiter or IP50 without gaiter					
Storage Temp (°C)	-20 to +70					
Operating Temp With Gaiter (°C)	+5 to +80					
Operating Temp Without Gaiter (°C)	-10 to +80					

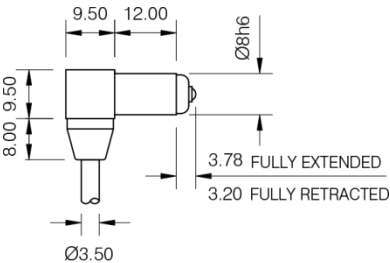
**1:** Accuracy µm or % reading, whichever is the greater

**2:** Obtained by repeated operation against a tungsten carbide target

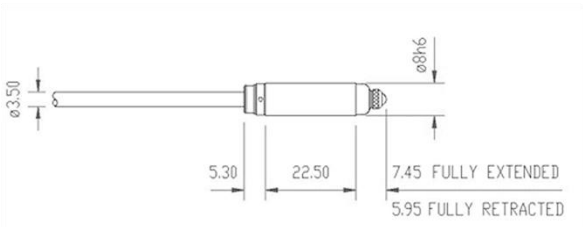
# Dimensions

## Special Spring Push Probes

Ultra Small ( AX0.25/S)



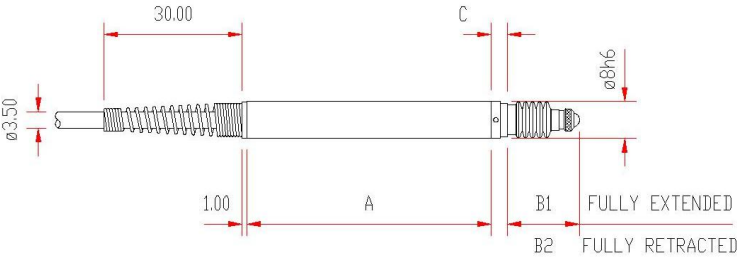
Ultra Short (AX/0.5/S)



## Standard Spring Push Axial (AX/S)

	AX/1/S	AX/1.5/S	AX5/1/S	AX/2/S	AX5/2/S	AX/2.5/S	AX/5/S	AX/10/S
A	43.00	58.00	75.00	53.00	*	63.00	87.00	127.00
C	3.5	4.00	4.00	3.50	*	4.00	4.00	3.00
B1	13.9	15.40	25.40	15.65	*	17.40	25.40	44.90
B2	11.4	11.40	14.40	10.65	*	11.40	14.40	23.90

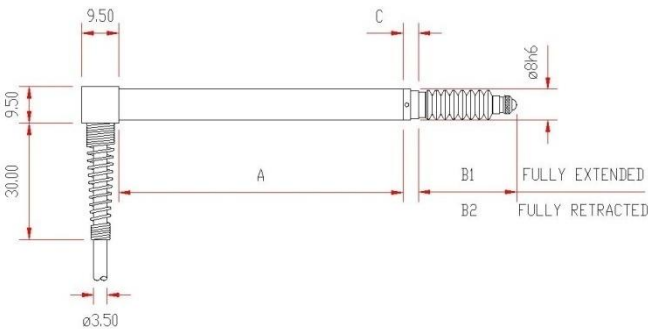
\* Dimensions available upon request



## Spring Push Right Angle (AXR/S)

	AXR/1/S	AXR/1.5/S	AXR5/1/S	AXR/2/S	AXR5/2/S	AXR/2.5/S	AXR/5/S	AXR/10/S
A	29.50	44.50	*	*	*	49.50	73.50	113.50
C	3.50	4.00	*	*	*	4.00	4.00	3.00
B1	13.90	15.40	*	*	*	17.40	25.40	33.90
B2	11.40	11.40	*	*	*	11.40	14.40	12.90

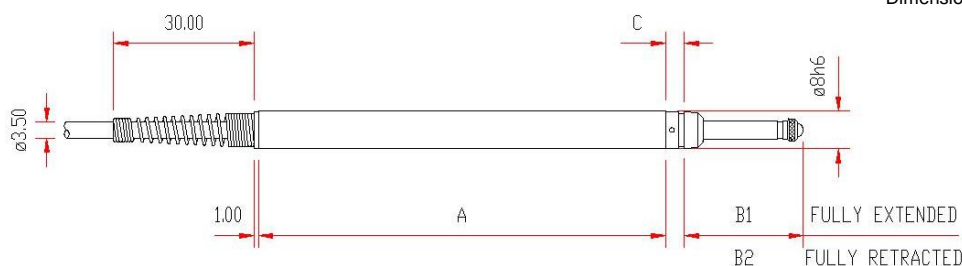
\* Dimensions available upon request



### Feather Touch Spring Push (AT/S )

	AT/1/S	AT5/1/S	AT/1.5/S	AT/2.5/S	AT/2/S	AT5/2/S	AT/5/S	AT/10/S
A	43.00	*	58.00	63.00	*	*	87.00	127.00
C	3.50	*	4.00	4.00	*	*	4.00	3.00
B1	13.90	*	15.40	17.40	*	*	25.40	33.90
B2	11.40	*	11.40	11.40	*	*	14.40	12.90

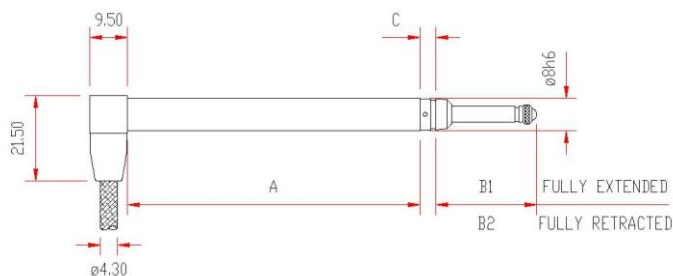
\* Dimensions available upon request



### Right Angle Feather Touch Spring Push with braided cable (ATR/S )

	ATR/1/S	ATR5/1/S	ATR/1.5/S	ATR/2/S	ATR5/2/S	ATR/2.5/S	ATR/5/S	ATR/10/S
A	29.50	*	44.50	*	*	49.50	73.50	113.50
C	3.50	*	4.00	*	*	4.00	4.00	3.00
B1	13.90	*	15.40	*	*	17.40	25.40	33.90
B2	11.40	*	11.40	*	*	11.40	14.40	12.90

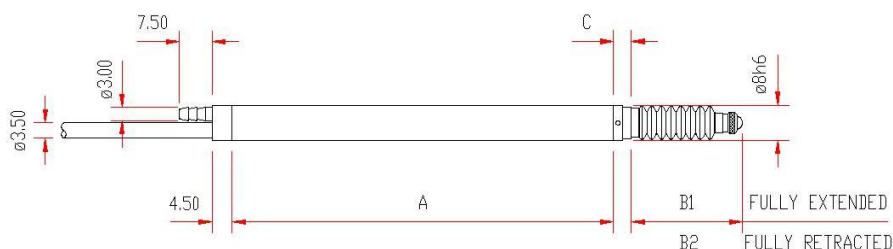
\* Dimensions available upon request



### Vacuum Retract (AX/V )

	AX/1/V	AX5/1/V	AX/1.5/V	AX/2/V	AX5/2/V	AX/2.5/V	AX/5/V	AX/10/V
A	43.00	84.00	58.00	*	*	63.00	87.00	127.00
C	3.50	4.00	4.00	*	*	4.00	4.00	3.00
B1	13.90	25.40	15.40	*	*	17.40	25.40	44.90
B2	11.40	14.40	11.40	*	*	11.40	14.40	23.90

\* Dimensions available upon request



# Gauging Probes: Pneumatic Push

## Standard - AX



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.

- Rugged design with IP65 rating
- 0.7 N Tip force
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- Tested to 13 million cycles
- Excellent linearity and repeatability

## J Type



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

- Actuation by inbuilt piston, independent of gaiter. Air exits via side port
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- No IP rating

## Feather Touch – AT



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.

- As low as 0.18 N Tip force
- Ideal for glass, electronics, and delicate surfaces
- $\pm 1$ ,  $\pm 2.5$ ,  $\pm 5$ ,  $\pm 10$  mm ranges
- Nylon and ruby tips available

## Ultra Feather Touch - AW



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

- Low 0.03 to 0.06 N tip force
- Ideal for delicate surfaces
- $\pm 5$  mm range
- Available in both spring and pneumatic



Pneumatic Push		LVDT	HB	LVDT	HB	LVDT	HB	LVDT	HB
Axial Cable Outlet :	Standard Pneumatic	AX1/1/P	AX1/1/PH	AX5/1/1/P	AX5/1/1/PH	AX1.5/1/P	AX1.5/1/PH	AX2/2/P	AX2/2/PH
	Jet Pneumatic	AJ1/1/P	AJ1/1/PH	AJ5/1/1/P	AJ5/1/1/PH	AJ1.5/1/P	AJ1.5/1/PH	-	-
	Feather Touch	AT1/1/P	AT1/1/PH	AT5/1/1/P	AT5/1/1/PH	AT1.5/1/P	AT1.5/1/PH	-	-
	Ultra feather Touch	-	-	-	-	-	-	-	-
Radial Cable Outlet:	Standard Pneumatic	AXR1/1/P	AXR1/1/PH	AXR5/1/1/P	AXR5/1/1/PH	AXR1.5/1/P	AXR1.5/1/PH	AXR2/2/P	AXR2/2/PH
	Jet Pneumatic	AJR1/1/P	AJR1/1/PH	AJR5/1/1/P	AJR5/1/1/PH	AJR1.5/1/P	AJR1.5/1/PH	-	-
	Feather Touch	ATR1/1/P	ATR1/1/SH	ATR5/1/1/P	ATR5/1/1/SH	ATR1.5/1/P	ATR1.5/1/SH	-	-
	Ultra feather Touch	-	-	-	-	-	-	-	-

#### Measurement Performance

Measurement Range (mm)	±1	±1	±1.5	±2
Accuracy (% of reading or µm) <b>1</b>	0.5 or 1 µm	0.5 or 1.0 µm	0.5 or 1.5 µm	0.5 or 2 µm
Repeatability (µm) <b>2</b>	0.15	0.15	0.15	0.15
Resolution	Dependent on associated electronics			
Pre-Travel (mm)	0.15	0.15	0.15	0.15
Post-Travel (mm)	0.85	8.85	0.85	1.35
Tip Force (N) at Middle of range ± 20 %				
Pneumatic at 0.4 Bar	0.7	0.7	0.7	0.7
Pneumatic at 1 Bar	2.6	2.6	2.6	2.6
Pneumatic Jet	0.85	0.85	0.85	-
Pneumatic Feather Touch ± 30% at 0.3 Bar	0.18	0.18	0.18	-
Pneumatic Feather Touch ± 30% at 0.1 Bar	1.1	1.1	1.1	-
Pneumatic Ultra Feather Touch ± 30% at 0.4 Bar	-	-	-	-
Temperature Coefficient %FS/°C	0.01	0.01	0.01	

#### Electrical Interface

Energising Voltage	1 to 10 Vrms							
Energising Current (mA/V ± 5%)	1.8	1	1.8	1	2	1	2	1
Sensitivity (mV/V/mm± 5%) Plugged	200	73.5	200	73.5	133	49	80	29.4
Sensitivity (mV/V/mm± 5%) Unplugged	210	83	210	83	150	82	150	82

#### Mechanical

Body Diameter (mm)	8h6							
Case	Stainless Steel							
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide							
Gaiter	Fluoroelastomer or Silicon							
Cable	PUR							

#### Environmental

Sealing For Probe	IP65 with gaiter or IP50 without gaiter							
Storage Temp (°C)	-20 to +70							
Operating Temp With Gaiter (°C)	+5 to +80							
Operating Temp Without Gaiter (°C)								

#### Operating Pressure Gauge (Bar)

Standard	0.4 – 1.0
Feather Touch	0.3 – 2.0
Jet	0.6 – 2.0

**1:** Accuracy µm or % reading, whichever is the greater

**2:** Obtained by repeated operation against a tungsten carbide target

Spring Push	LVDT	HB	LVDT	HB	LVDT	HB	LVDT	HB
Axial Cable Outlet : Standard Pneumatic Jet Pneumatic Feather Touch Ultra feather Touch	AX5/2/P AJ5/2/P AT5/2/P -	AX5/2/P H  AJ5/2/PH  AT5/2/P H -	AX/2.5/P AJ/2.5/P AT/2.5/P -	AX/2.5/PH AJ/2.5/PH AT/2.5/PH	AX/5/P AJ5/P AT/5/P AW/5/P	AX/5/P H AJ/5/PH AT/S/P H AW/5/P H	AX/10/P AJ/10/P AT/10/P -	AX/10/PH AJ/10/PH AT/10/PH -
Radial Cable Outlet : Standard Pneumatic Jet Pneumatic Feather Touch Ultra feather Touch	AXR5/2/ P AJR5/2/ P ATR5/2/ P -	AXR5/2/ PH AJR5/2/P H ATR5/2/ PH -	AXR/2.5/P AJR/2.5/P ATR/2.5/P -	AXR/2.5/P H AJR/2.5/PH ATR/2.5/PH -	AXR/5/P AJR/5/P ATR/5/P AW/5/P	AXR/5/ PH AJR/5/P H ATR/S/ PH AW/5/P H	AXR/10/P AJR/10/P ATR/10/P -	AXR/10/PH AJR/10/PH ATR/10/PH -

#### Measurement Performance

Measurement Range (mm)	±2	±2.5	±5	±10
Accuracy (% of reading or µm)	0.5 or 2 µm	0.5 or 2.5 µm	0.5 or 5 µm	0.7 or 10 µm
Repeatability (µm)	0.15	0.15	0.15	0.25
Resolution	Dependent on associated electronics			
Pre-Travel (mm)	0.15	0.15	0.15	0.15
Post-Travel (mm)	0.85	0.85	0.85	0.85
Tip Force (N) at Middle of range ± 20 %				
Pneumatic at 0.4 Bar	0.7	0.7	0.7	0.7
Pneumatic at 1 Bar	2.6	2.6	2.6	2.6
Pneumatic Jet	0.85	0.85	0.85	0.85
Pneumatic Feather Touch ±30% at 0.3 Bar	0.18	0.18	0.18	0.18
Pneumatic Feather Touch ±30% at 0.1 Bar	1.1	1.1	1.1	1.1
Pneumatic Ultra Feather Touch ± 30% at 0.4 Bar	-	-	0.03-0.05	-
Temperature Coefficient %FS/°C	0.01	0.01	0.01	0.01

#### Electrical Interface

Energising Voltage	1 to 10 Vrms							
Energising Current (mA/V ± 5%)	2	1	2	1	2	1.2	1	1.2
Sensitivity (mV/V/mm± 5%) Plugged	80	29.4	80	29.4	40	14.7	20	7.35
Sensitivity (mV/V/mm± 5%) Unplugged	150	82	150	82	105	51	33	33

#### Mechanical

Body Diameter (mm)	8h6							
Case	Stainless Steel							
Probe Tip (options)	Nylon, Ruby, Silicon Nitride, Tungsten Carbide							
Gaiter (Note 6)	Fluoroelastomer or Silicon							
Cable	PUR							

#### Environmental

Sealing For Probe	IP65 with gaiter or IP50 without gaiter							
Storage Temp (°C)	-20 to +70							
Operating Temp With Gaiter (°C)	+5 to +80							
Operating Temp Without Gaiter (°C)	-10 to +80							

1: Accuracy µm or % reading, whichever is the greater

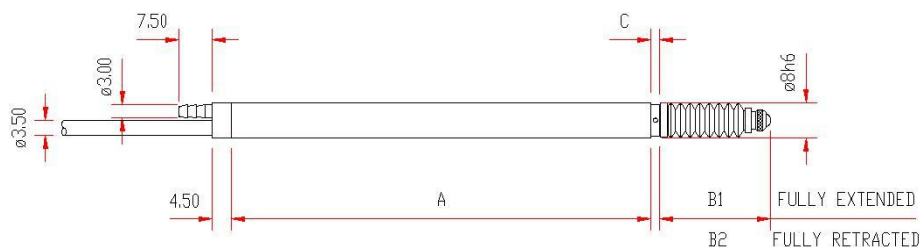
2: Obtained by repeated operation against a tungsten carbide target

## Dimensions

### Pneumatic Push Axial (AX/P)

	AX/1/P	AX5/1/P	AX/1.5/P	AX/2/P	AX5/2/P	AX/2.5/P	AX/5/P	AX/10/P
A	49.00	84.00	*	*	*	71.00	96.00	127.00
C	2.00	2.00	*	*	*	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

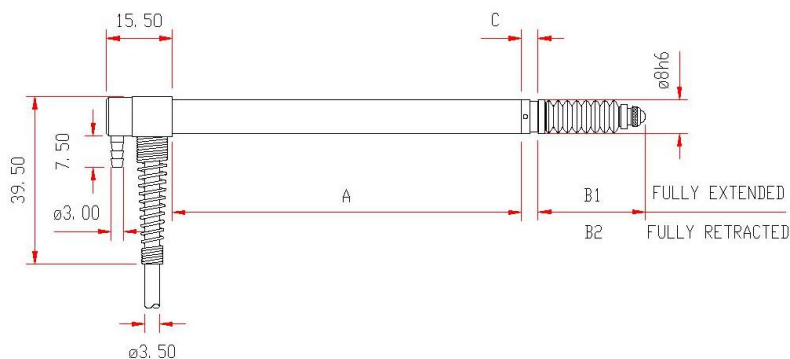
\* Dimensions available upon request



### Right Angled Pneumatic Push with 90° Output and non braided cable (AXR/P)

	AXR/1/P	AXR5/1/P	AXR/1.5/P	AXR/2/P	AXR5/2/P	AXR/2.5/P	AXR/5/P	AXR/10/P
A	35.50	*	*	*	*	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	*	*	*	*	17.40	14.40	12.90

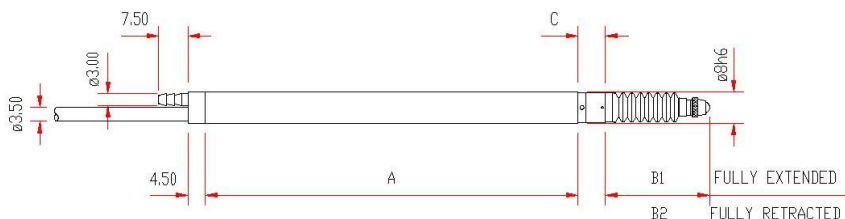
\* Dimensions available upon request



### Gaiter Independent Pneumatic Push (AJ/P)

	AJ/1/P	AJ5/1/P	AJ/1.5/P	AJ/2/P	AJ5/2/P	AJ/2.5/P	AJ/5/P	AJ/10/P
A	49.0	84.0	*	*	*	71.0	96.0	*
B1	15.4	26.9	*	*	*	18.9	26.9	*
B2	12.4	15.9	*	*	*	12.9	15.9	*
C	7.0	7.0	*	*	*	7.0	7.0	*

\* Dimensions available upon request



	AT/1/P	AT5/1/P	AT/1.5/P	AT/2/P	AT5/2/P	AT/2.5/P	AT/5/P	AT/10/P
A	49.00	*	*	*	*	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	11.40	12.90

Technical drawing of a telescopic tube assembly showing two states: Fully Extended and Fully Retracted.

Dimensions (mm):

- Outer diameter of the main tube:  $\varnothing 3.50$
- Inner diameter of the sleeve:  $\varnothing 3.00$
- Sleeve thickness:  $7.50$
- Distance from the sleeve end to the main tube end:  $4.50$
- Distance between the two states:  $A$
- Distance from the sleeve end to the main tube end (Fully Extended):  $B1$
- Distance from the sleeve end to the main tube end (Fully Retracted):  $B2$
- Distance from the sleeve end to the main tube end:  $C$

	ATR/1/P	ATR5/1/P	ATR/1.5/P	ATR/2/P	ATR5/2/P	ATR/2.5/P	ATR/5/P	ATR/10/P
A	35.50	*	*	*	*	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

# Accessories



## Replacement Gaiters

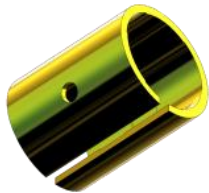
Gaiters can be replaced when damaged. Only pneumatic push probes require gaiter rings.

Spring Push	Part Number	Pneumatic Push	Part Number
A6G/1/S	205014	-	-
AX/1/S	204851	AX/1/P	802691
AX/1.5/S	204851	AX/1.5/P	204894
AX/2.5/S	204894	AX/2.5/P	802692
AX/5/S	204860	AX/5/P	802693
AX5/1/S	204860	AX5/1/S	802693
AX/10/S	205906	AX/10/P	803235



## Right Angle Adaptor

For use with spring push gauging probes.  
Part Number: 203224



## Clamping Collet

For use with all 8 mm clamping shaft sensors. The clamping collet distributes the clamping forces evenly around the shaft. Using the supplied grub screw, the probe can be loosened while holding the collet in place.

Part number: 806966-SX (10mm)  
805048-SX (9.5 mm)



## Imperial Adaptor Sleeves

Adapter Sleeves can be used to increase the body diameter of 8 mm sensors to 9.512 (3/8"). Available in lengths from 12 to 127 mm.

## Imperial Split Adaptor Sleeves

Adapter Sleeves can be used to increase the body diameter of 8 mm sensors to 9.512 (3/8"). Available in lengths from 12 to 127 mm.



## Extension Cable

Extension cables for analogue sensors with 5 pin DIN 240° connectors are available for LVDT and Half Bridge types.

# Block Gauge Family

## Universal Gauges

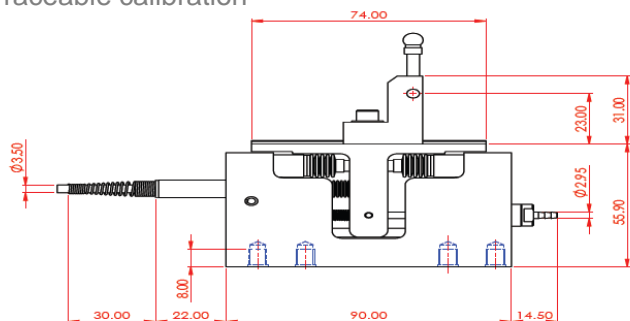
### Description

Solartron's family of 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 family of universal gauges includes 2 mm, 5 mm and 10 mm measurement ranges, the 5 mm unit is used in most gauging applications and the 10 mm is designed for applications requiring a longer range. 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 are available in LVDT, half bridge and 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.

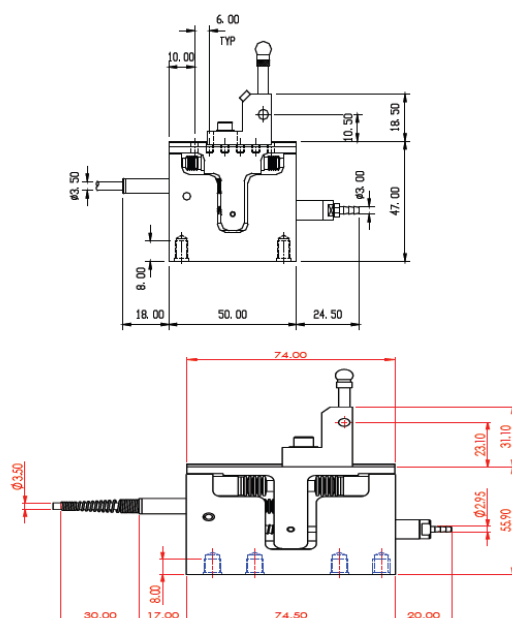
### Features

- 2 mm, 5 mm and 10 mm total measuring range
- Repeatability <0.25 µm
- Compact size 2 mm unit
- LVDT or half bridge configuration
- Pneumatic or spring actuation
- Adjustable anti-rotation guide
- All stainless steel construction
- Large range of changeable tips
- IP65 protection
- Good linearity over the full measuring range
- High accuracy
- Traceable calibration



### Mechanical Outline

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



	Analogue	
<b>Measurement</b>		
Measurement Range	$\pm 1.0$ , $\pm 2.5$ and $\pm 5.0$	
Mechanical Travel (mm)	3, 6 and 11	
Accuracy <b>1</b>	At 5 kHz for LVDT at 10 kHz for Half Bridge (Whichever is greater)	
2mm	$\pm 1.0 \mu\text{m}$ or $\pm 0.5\% \times D$	
5mm	$\pm 2.5 \mu\text{m}$ or $\pm 0.5\% \times D$	
10mm	$\pm 5.0 \mu\text{m}$ or $\pm 0.5\% \times D$	
Repeatability (on-axis at 70g tip force) <b>2</b>		
2mm	$< 0.25 \mu\text{m}$	
5mm	$< 0.25 \mu\text{m}$	
10mm	$< 0.5 \mu\text{m}$	
Resolution	Dependant on associated electronics	
Null Position	Adjustable	
Tip Force		
2mm	0.75 N	
5mm	0.75 N	
10mm	0.75 N	
Temperature Coefficient		
2mm	$\pm 0.2 \mu\text{m}/^\circ\text{C}$	
5mm	$\pm 0.5 \mu\text{m}/^\circ\text{C}$	
10mm	$\pm 1.0 \mu\text{m}/^\circ\text{C}$	
Life	Better than 5 million measuring cycles (dependant on application)	
<b>Mechanical</b>		
Mass (less tool holder)		
2mm	160 g (0.232 lbs)	
5mm	390g (0.858 lbs)	
10mm	385 g (0.847 lbs)	
Mass of moving part (less tool holder)		
2mm	35 g (0.077 lbs)	
5mm	90 g (0.198 lbs)	
10mm	95 g (0.209 lbs)	
<b>Materials</b>		
Material	Stainless steel (300 series) with gaiters	
IP Rating	IP65	
Operating Pressure	1 bar to 3 bar	
<b>Environmental</b>		
Storage Temperature ( $^\circ\text{C}$ )	-40 to +85	
Operating Temperature ( $^\circ\text{C}$ )	+5 to +85	
Shock	To maintain best performance the Block Gauge should be protected from excessive shock loads and dropping	
<b>Electrical Interface</b>	LVDT	Half bridge
Energising Voltage	1 to 10 V rms	
Energising Frequency	2 to 20 kHz	
Energising Current	2 mA/V at 5 kHz	2 mA/V at 10 kHz
Calibration Voltage	3V	
Calibration Frequency	5 kHz	10 kHz
Calibration Load	10 k $\Omega$	2 k $\Omega$
Sensitivity (mV/V/mm)	At 5 kHz	At 10 kHz
2mm	200 $\pm 0.5\%$	73.5 $\pm 0.5\%$
5mm	80 $\pm 0.5\%$	29.4 $\pm 0.5\%$
10mm	40 $\pm 0.5\%$	14.7 $\pm 0.5\%$

1: Accuracy  $\mu\text{m}$  or % reading, whichever is the greater

2: Obtained by repeated operation against a tungsten carbide target

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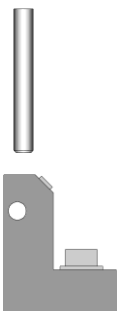


## Block Gauge Accessories

All gauges are supplied configured as spring push. A customer fit pneumatic actuator is required to convert spring push to pneumatic operation. The Block Gauge is inclusive of integral sensor but does not include the pneumatic actuator, additional springs, tool holder, tip carrier or tips. These must be ordered separately.



Tips with industry standard M2.5 thread. Download the PDF file for the tips from [www.solartronmetrology.com](http://www.solartronmetrology.com)



Tip Carrier

	4mm dia. Tip Carriers (for use with 4mm Tool Holders)	6mm dia. Tip Carriers (for use with 6mm Tool Holder only)
20 mm Length	208221/20	-
30 mm Length	208221/30	208453/30
40 mm Length	208221/40	208453/40
50 mm Length	-	208453/50

Analogue Block Gauge

LVDT						
	± 1.0 mm Stroke		± 2.5 mm Stroke		± 5 mm Stroke	
	Product	P/N	Product	P/N	Product	P/N
Standard Plugged	BG/1.0/S	925165	BG/2.5/S	924750	BG/5.0/S	924992
Standard R/A Plugged	-	-	BGR/2.5/S	924886	BGR/5.0/S	924996
Standard Unplugged	BG/1.0/S	925099	BG/2.5/S	924713	BG/5.0/S	924990
Standard R/A Unplugged	-	-	BGR/2.5/S	924884	BGR/5.0/S	924994

Half Bridge						
	± 1.0 mm Stroke		± 2.5 mm Stroke		± 5 mm Stroke	
	Product	P/N	Product	P/N	Product	P/N
Standard Plugged	BG/1.0/SH	925166	BG/2.5/SH	924751	BG/5.0/SH	924993
Standard R/A Plugged	-	-	BGR/2.5/SH	924887	BGR/5.0/SH	924997
Standard Unplugged	BG/1.0/SH	925100	BG/2.5/SH	924714	BG/5.0/SH	924991
Standard R/A Unplugged	-	-	BGR/2.5/SH	924885	BGR/5.0/SH	924995



Pneumatic Actuator

For 2mm Block Gauge

P/N 806313-SX

For 5mm and 10mm Block Gauge

P/N 805490-SX

## Replacement Springs

	Spring Part Number		
	2 mm Block Gauge	5 mm Block Gauge	10 mm Block Gauge
70 g	208574-070	-	-
75 g	-	208212-075	-
100 g	208574-100	208212-100	-
150 g	208574-150	208212-150	208418-150
200 g	205874-200	-	-
250 g	-	208212-250	208418-250
350 g	-	208212-350	208418-350



# Flexure Family

## Specialist gauges

### Description

Very high resolution and gauge R&R at  $<0.1 \mu\text{m}$  maintained without degradation over millions of measuring cycles is the hallmark of Solartron analogue gauging flexures.

Analogue flexures are the ideal solution for high precision/high volume post-process or in-process gauging applications, where cycle time is short and high throughput would shorten the life of a conventional pencil probe.

There are no sliding parts to wear out or to cause friction within the frame or sensor, which makes Solartron flexures virtually free from hysteresis.

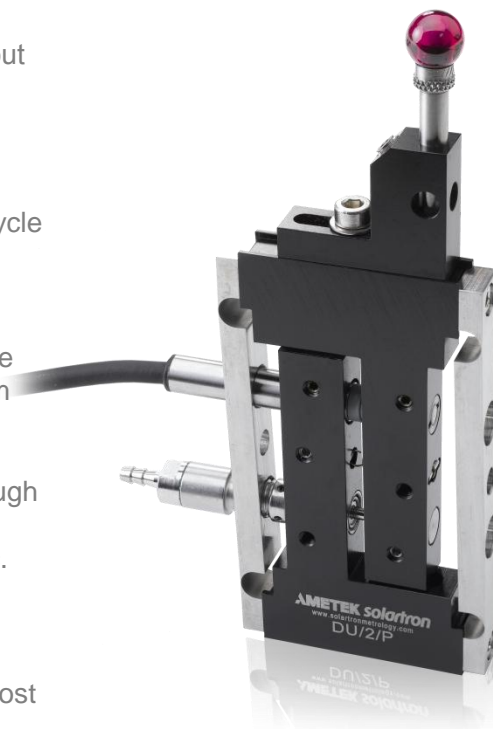
Flexures can be mounted such that there is little or no stress through the gauge centre line and enabling precision profiling of moving material, such as sheet material or rotating shafts, brake discs etc.

The flexure gauge has forward and reverse spring action with a pneumatically actuated version available for automatic measurements. It is supplied in analogue form for plugging into most standard amplifiers. For improved performance Solartron recommends the Digital Flexure use with the Orbit® Digital Measurement System.

The tool mounting assembly can be variously adjusted along the gauge's length and fixed with M3 bolts. A selection of tips is offered to suit each application. The unique design offers a high degree of factory serviceable parts, providing a low cost repair which in turn reduces the cost of ownership to the end customer.

### Features

- $\pm 0.5$  &  $\pm 1.0$  mm measuring ranges
- Extended operating life:  $>20$  million cycles
- Excellent repeatability:  $<0.1 \mu\text{m}$
- Excellent resolution
- Half Bridge or LVDT configuration
- Spring push or pneumatic operation
- IP65 protection
- Large selection of contact tips
- 3D drawings available
- High degree of serviceable parts



## Technical specification

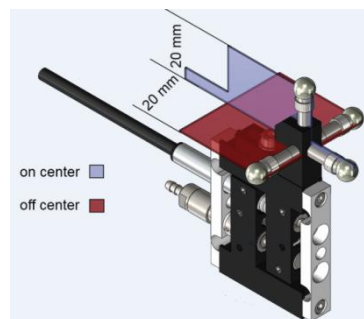
### Analogue Flexure

	AU/0.5	AU/1
Measurement performance		
Mechanical travel	1.7 mm	2.5 mm
Measurement range	1.0 mm	2.0 mm
Repeatability	<0. 1µm	
Resolution	Dependent on associated electronics	
Accuracy % reading	0.1	
Tip force spring push (horizontal attitude ± 20%)	1.5 N at mid position	
Tip force pneumatic (horizontal attitude)	1.0 N at mid position at 2 bar	
Temperature coefficient	<0.01% FS / °C	
Mechanical		
Flexure material	Aluminium and steel	
Mass (including tool holder, 20mm tip holder and ball tip) excluding PIE/Cable	<60g	<70g
Mass of tool holder and screw	6g	
Gaiter material	High grade polymer	
Cable type and length	2m PUR	
Operating life (dependant on application)	>20 million cycles	
Pneumatic operating pressure	1.5 bar to 2.5 bar relative	
Environmental		
IP rating	IP65 (flexure only)	
Operating temperature, flexure only	+5 to +85 °C	
Operating temperature, flexure and electronics	+5 to +65 °C	
Electrical Interface		
	LVDT	Half Bridge
Energising voltage	1 to 10 Vrms	
Energising frequency	2 to 20 kHz	
Energising current	3 mA/V at 5 kHz	1.5 mA/V at 10 kHz
Calibration load	5 kΩ	2 kΩ
Standard calibration parameter	200 mV/V/mm ±0.5% at 5 kHz, 3 V rms	73.5 mV/V/mm ±0.5% at 10 kHz, 3 V rms

## Zonal Repeatability

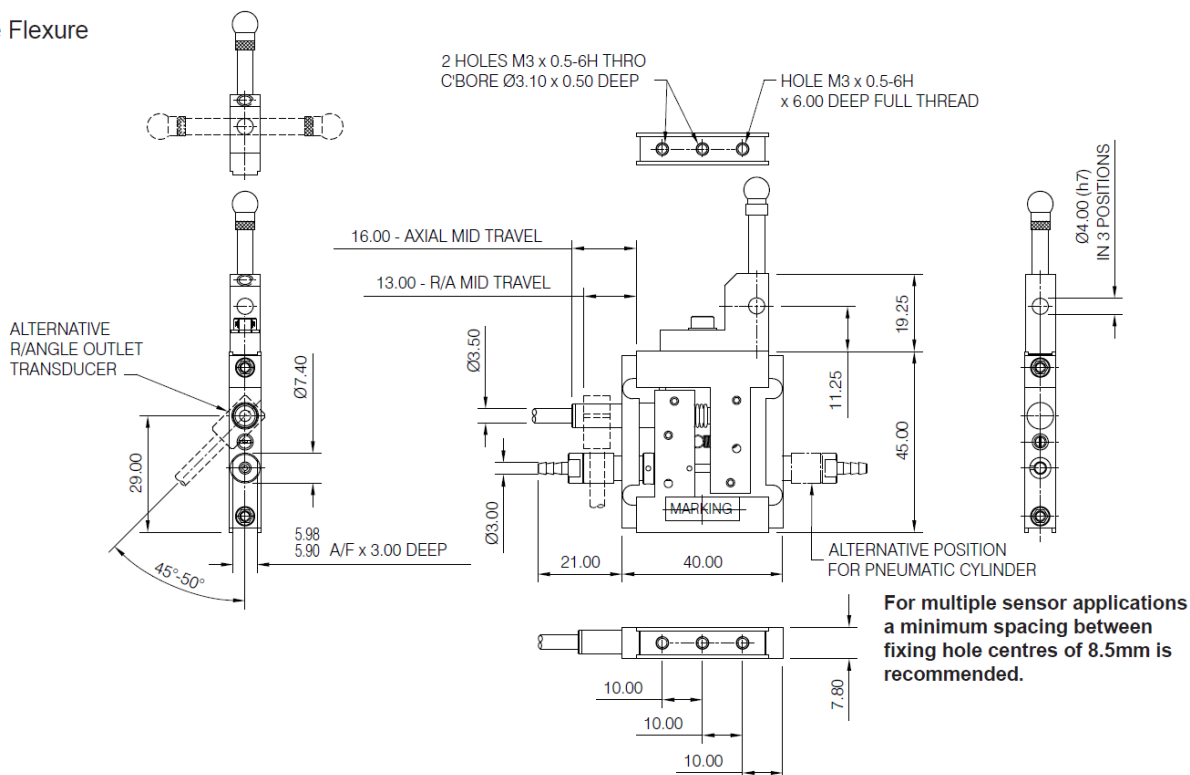
For optimal gauging performance the recommended operation is on centre. The specification is valid when using Solartron standard tool holder, tip holder and tip.  
(Tip used is 6.35 mm TC Ball Tip)

Repeatability	AU/0/5 and AU/1
On centre	<0.1 µm
Off centre	<0.5 µm

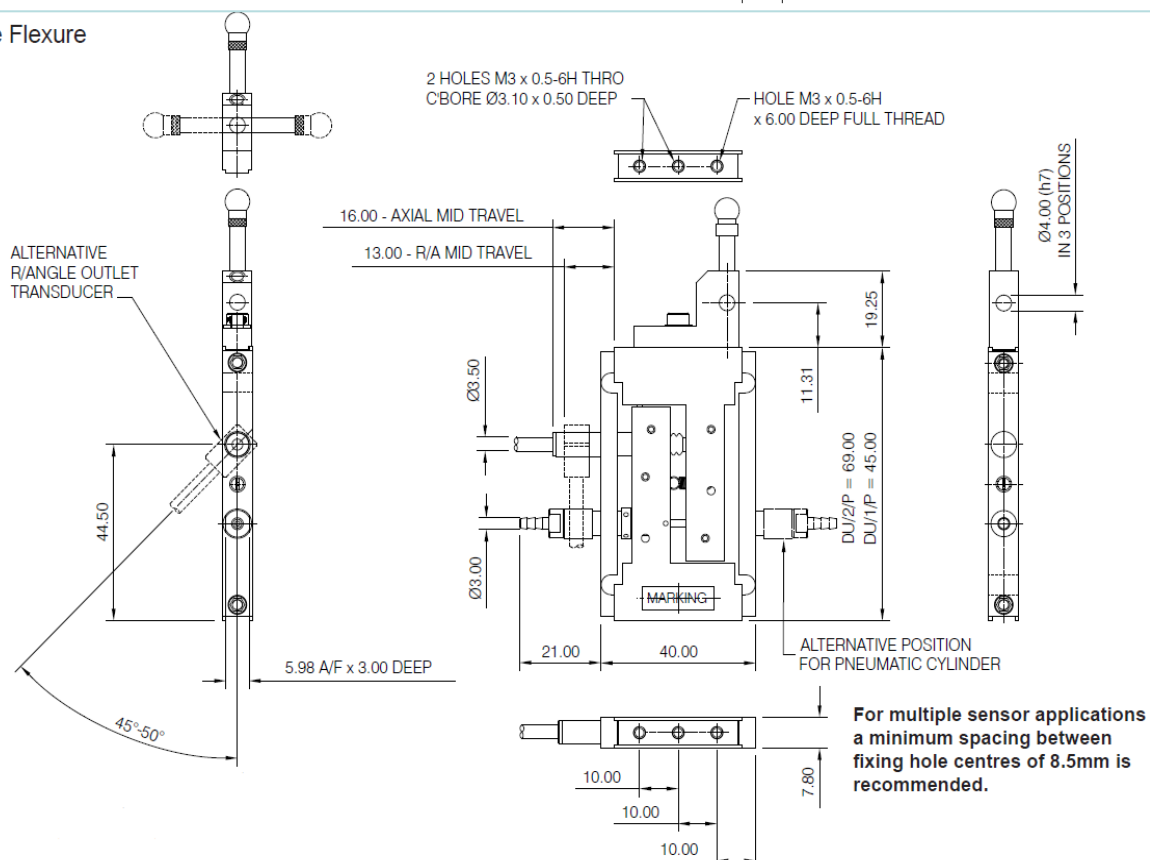


## Dimensions

### Analogue Flexure AU/0.5



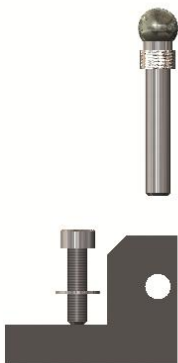
### Analogue Flexure AU/1



# Analogue Flexure: Components

The gauge is supplied inclusive of sensor but does not include the tool holder, tip carrier or tips. There are versions for spring push and pneumatic push with axial and radial cable exit. Solartron supplies flexures calibrated to suit your non-Solartron electronics. Please contact your nearest Solartron representative for details.

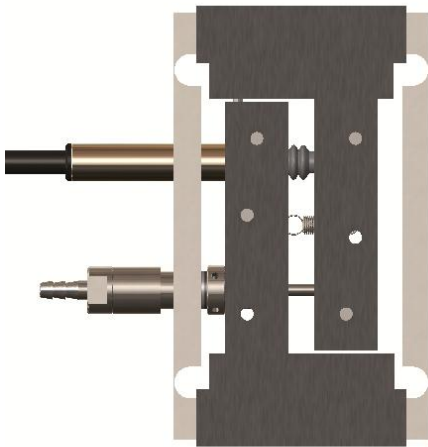
Accessories are common to both AU/0.5 and AU/1 versions.



Tips  
With industry standard M2.5 thread.  
See [www.solartronmetrology.com](http://www.solartronmetrology.com) for a list of available tips

Tip holders  
20 mm length Part number 208221/20  
30 mm length Part number 228221/30  
40 mm length Part number 228221/40

Tool holder  
Part number 806274



Product Type	AU/0.5		AU/1	
	LVDT	Half bridge	LVDT	Half bridge
Axial Cable Outlet	± 0.5 mm		± 1.0 mm	
Forward Spring	AU/0.5/S	AU/0.5/SH	AU/1.0/S	AU/1.0/SH
Reverse Spring	AU/0.5/R	AU/0.5/RH	AU/1.0/R	AU/1.0/RH
Reverse Spring Pneumatic	AU/0.5/P	AU/0.5/PH	AU/1.0/P	AU/1.0/PH
Radial Cable Outlet				
Forward Spring	AUR/0.5/S	AUR/0.5/SH	AUR/1.0/S	AUR/1.0/SH
Reverse Spring	AUR/0.5/R	AUR/0.5/RH	AUR/1.0/R	AUR/1.0/RH
Reverse Spring Pneumatic	AUR/0.5/P	AUR/0.5/PH	AUR/1.0/P	AUR/1.0/PH

## Single Leaf Flexure

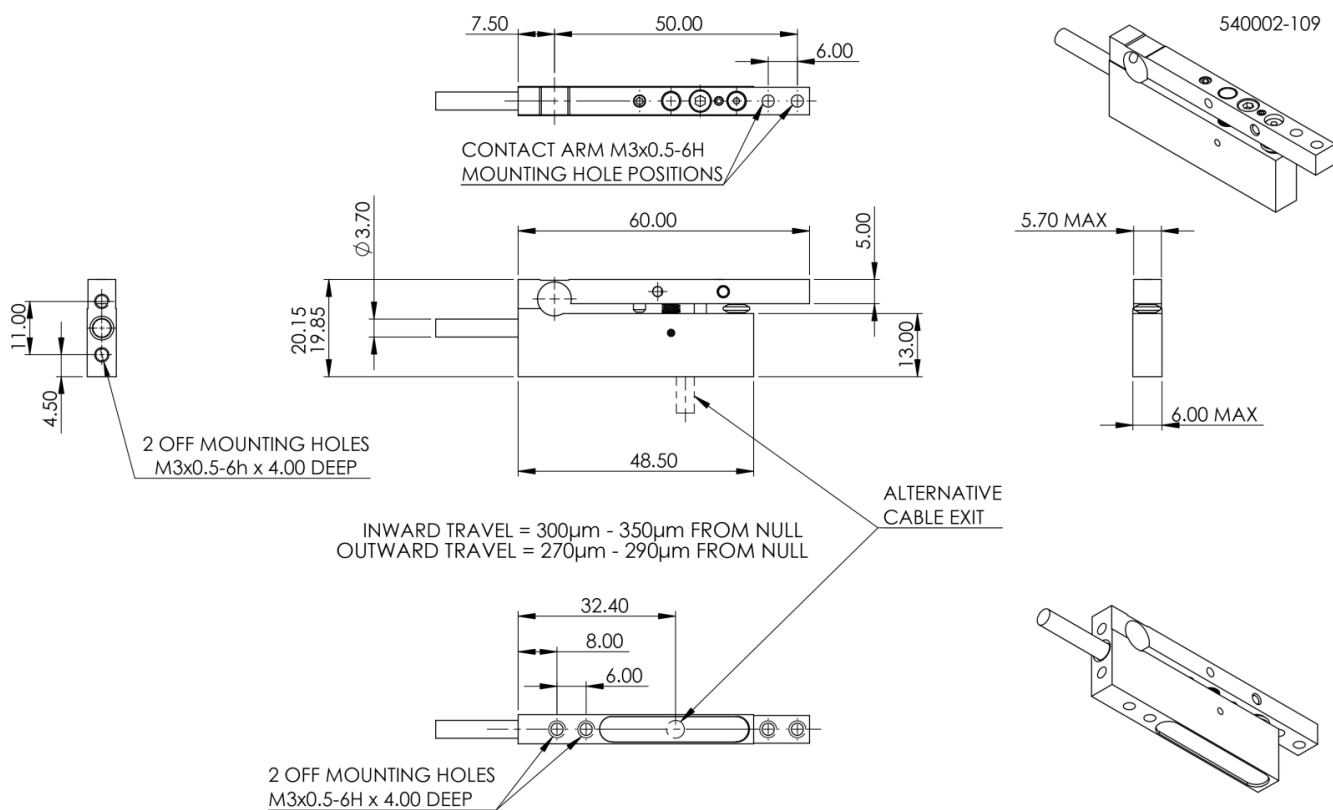
Due to the flexible design of the Single Leaf Flexure, users can fit extension arms to increase the reach and versatility of the transducer; typical applications are shim selection or measuring a feature inside a recess. The flexure may be mounted so that little stress is applied through the gauge centre line, thus enabling precision profiling of moving materials such as sheet material, brake disks or rotating shafts.



Technical Specification	
	AUS/0.25/S
Single Leaf Flexure Element	
Frame width (mm)	6
Coil configuration	LVDT
Measurement range (mm)	±0.25
Outward travel from mid range	290/270 µm1
Inward travel from mid range	300/350 µm1
Linearity (% of FRO)	0.3
Repeatability (µm)	0.15 <sub>1</sub>
Sensitivity	196 mV/V/m +5% at 7.5 KHz / 1 MΩ Load
Energising current	2.2 mA/V @ 7.5 KHz
Tip force @ mid range	1.25 N <sub>1</sub>
Environmental protection	IP65
Life (dependant on application)	20 million cycles typ.
Temperature range (°C)	
Storage	-20 to +70
Probe operating	+5 to +65
PIE / T-con operating	0 to 60
Materials	
Body	Steel
Gaiter	High grade polymer
Cable	2 m PUR

<sub>1</sub> based on 50 mm built-in arm (see drawing). Varies with different arm extensions and tips

## Dimensions



# Mini Probe

Low profile transducer

## 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 it provides excellent repeatability over a long working life, even when rotated in bores that have key slots of lubrication ports.

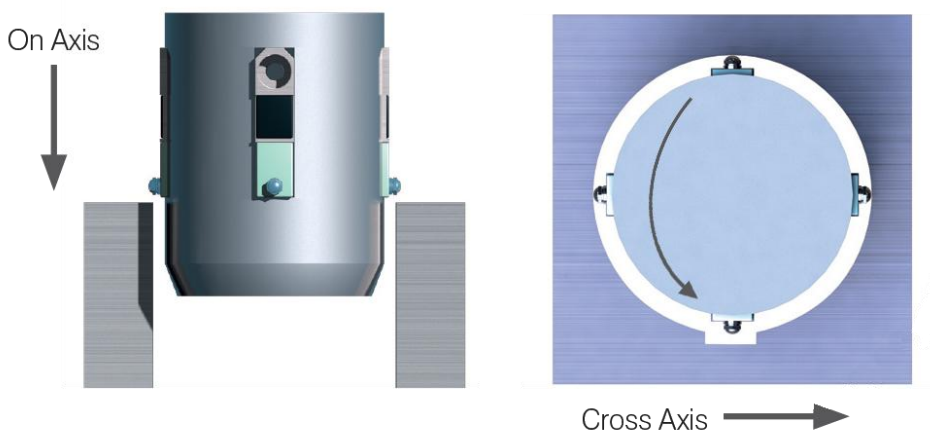
A Tungsten Carbide contact tip is fitted as standard but a selection of customer replaceable tips with an M2 thread is available for special applications.

## Features

- $\pm 0.25$  and  $\pm 0.5$  mm measuring range
- Excellent repeatability in both planes of operation
- Strong frame enables rotation in bores with key slots
- Changeable contact tips
- IP65 protection
- Compact size
- Simple installation



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



## Technical specification

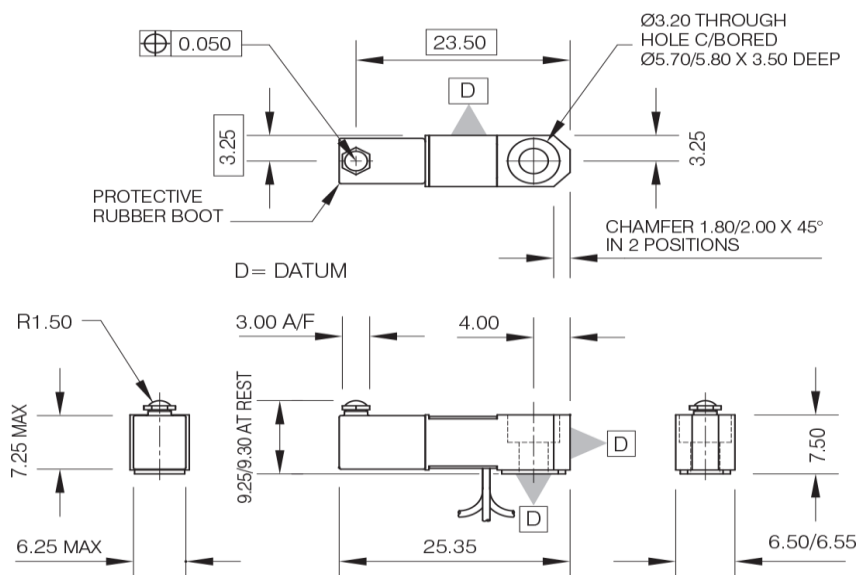
### Mini Probe

Spring Push	AM/0.25/S		AM/0.5/S	
Measurement performance				
Measurement Range (mm)	±0.25		±0.5	
Linearity %FSO	1.0			
Repeatability (µm)	On Axis	Cross Axis	On Axis	Cross Axis
Range: 0-100 µm nominal	0.1	0.1	0.1	0.1
Range: 100-250 µm nominal	0.25	0.15	0.1	0.1
Range: 250-500 µm nominal	0.5	0.25	0.15	0.15
Range 500 - 1000 µm nominal	N/A	N/A	0.3	0.2
Resolution (µm)	Depends on electronics			
Pre Travel (mm)	0.01/0.02		0.015/0.025	
Post Travel (mm) (Min)	0.07		0.07	
Tip Force (N) at Middle of Range ±20 %				
Spring Push	0.7		0.7	
Temperature Coefficient %FS/°C	0.08		0.08	
Environmental				
Sealing for Probe	IP50			
Storage Temperature (°C)	-20 to +80			
Probe Operating Temperature with Gaiter (°C)	+5 to +80			
Shock	Do not subject to excessive shock – follow instructions when installing and adjusting			
Material				
Probe Body	Steel			
Probe Tip (options)	Ruby, Silicon Nitride, Tungsten Carbide			
Gaiter	Fluroelastomer			
Cable	PUR			
Electrical				
Operating Frequency	13			
Load	2kΩ			
Operating Voltage rms	3			
Plugged Sensitivity mV/V/mm (+/-0.5%)	76			
Minimum Cable Bend Radius mm				
Static (Fixed installation)	5			
Dynamic (continuous flex)	12.5			

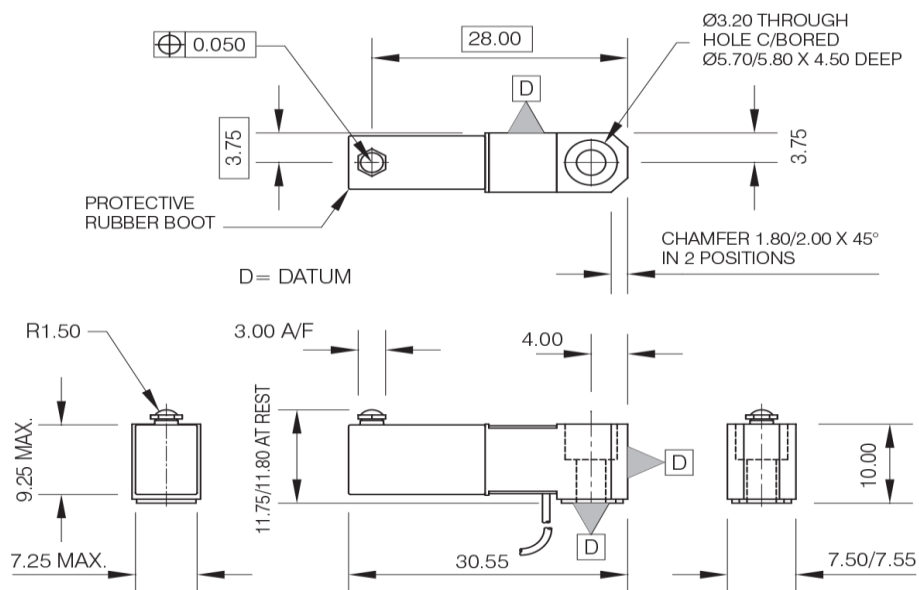


## Analogue Mini Probes: Dimensions

AU/0.25/S



AU/0.5/S



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

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## Analogue Electronics

### OD Series

The OD series of conditioning units is used to interface with Solartron's sensors to provide different functionality to suit different applications.

The OD2 is a two wire 4-20 mA signal conditioner. It is designed for long distance signal transmission due to low noise susceptibility. A cable break results in no current flow indicating a fault.

The OD4 (OD5 is a mains powered equivalent) is a signal conditioning unit powered from a single 10-30 VDC supply. The outputs are fully adjustable allowing a range of voltage and current outputs to be selected.



#### DRC DIN Rail Module

The DRC is a DIN rail mounted version of the OD4 (see above).



#### BICM in line module

The BICM provides a simple low-cost in-line conditioning unit. This is designed for use where the sensor is in a harsh environment as the BICM can be connected up to 10 m from the sensor. An IP67 variant of the BICM is also available.

#### ATM TLL converter

TTL RS232 Differential Quadrature is one of the most commonly used methods of communication between Linear Displacement Sensors and Control or Data Acquisition Systems. Its simplicity of interfacing with programmable systems also makes Solartron's ATM one of the most cost effective.

Power Requirement	OD2	OD4	OD5	DRC	BICM	
Input Voltage VDC	13-42	10-30	N/A	10-30V	±15	24
Input Voltage VAC	N/A	N/A	90-264	N/A	N/A	N/A
Input Current (mA)	<30	140 at 10V 50 at 30V	250	160 at 10V 70 at 30V	±12	24
Frequency (Hz)	N/A	N/A	47-63	N/A	N/A	N/A

Transducer Interface				
Primary voltage (Vrms)	0-9		3	1.2 – 21
Primary frequency (kHz)	5 or 13	2.5 or 5	5,10 or 13	2.5 to 20
Input Range	30-530mV/V <sup>1</sup>	55 to 5000mV		up to 3.5
Input Load (kΩ)	2	2, 10, 100	2, 100	100
Options	Forward and reverse			see note 2

Output				
Voltage Output VDC		Up to ±10		
Current Output mA	4-20	Up to ±20 into 150Ω load		
Output Ripple	<38μA rms	<1 mV rms		<14 mV rms
Output Offset	Up to 100% on maximum gain (coarse and fine adjustment)			
Temperature Coefficient Gain (%FSO/°C)		<0.01		<0.03
Temperature Coefficient Offset (%FSO/°C)		<0.01		<0.02
Warm Up (minutes)	15 minutes			
Linearity (%FSO)		<0.02		<0.1
Bandwidth (-3dB) (Hz)	25		500Hz, 1khz	

Environmental (Note 3)				
Storage Temperature	-40 to +80		-20 to +80	-20 to +80
Operating Temperature	0 to +60			
IP rating	65	40	40	None 40/67 40

Mechanical				
Transducer Connections	Terminals	Din Connector	Terminals	Solder tag or
Power connections	Terminals	IEC320 C14		factory fit for IP67
Weight	ABS	Painted Aluminium Box	Plastic	Plastic or
Material			DIN rail	In line
Mounting				

Note 1: For transducers with sensitivity > 250mV/V, an adjustable attenuator is required- contact sales

Note 2; Transducer is connected via external screw terminal user can therefore configure options

Note 3: For higher environmental levels(and other custom options) contact sales office

#### Measurement

Transducer types
Accuracy (%FSO)
Resolution (x4 interpolation)
Repeatability

#### ATM TTL Converter

All Solartron Displacement Transducers
<0.25
0.1
transducer dependent

#### Electrical

Power
Output Signal
Output frequency (kHz)
Bandwidth

+5 ±0.25 VDC @ 100 mA
A and B, /A and /B TTL square waves RS422 levels
50, 100, 125, 250, & 500 (factory selectable)
100 Hz

#### Environmental (electronics)

Sealing
Operating temperature (°C)
Storage temperature (°C)

IP43
0 to +60
-20 to +70

Refer to product manual 502724 for details of operation – contact sales office/web site

[www.solartronmetrology.com](http://www.solartronmetrology.com) • [sales.solartronmetrology@ametec.com](mailto:sales.solartronmetrology@ametec.com)

**For 3D drawings, please contact [sales.solartronmetrology@ametek.co.uk](mailto:sales.solartronmetrology@ametek.co.uk)**

**United Kingdom - Head Office**

Solartron Metrology  
Steyning Way  
Bognor Regis  
West Sussex  
PO22 9ST  
Tel: +44 (0) 1243 833333  
Fax: +44 (0) 1243 833322  
[Sales.solartronmetrology@ametek.com](mailto:Sales.solartronmetrology@ametek.com)

**France**

Solartron Metrology  
Rond-point de l'Espine des Champs  
Buroplus - Bat. D  
Elancourt 78990  
Tel: +33 (0)1 30 68 89 50  
Fax: +33 (0)1 30 68 89 59  
[france.solartronmetrology@ametek.com](mailto:france.solartronmetrology@ametek.com)

**Germany**

Ametek GmbH  
Solartron Metrology Division  
Rudolf-Diesel-Strasse 16  
40670 Meerbusch  
Tel: +49 (0) 2159 9136 500  
Fax: +49 (0) 2159 9136 505  
[vertrieb.solartron@ametek.de](mailto:vertrieb.solartron@ametek.de)

**Brazil**

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

**India**

Ametek Instruments India Private Limited  
1st Floor, Left Wing  
Prestige Featherlite Tech Park  
Plot #148, EPIP II Phase  
Whitefield, Bengaluru 560 066  
Karnataka, India  
Tel: +91 80 6782 3200  
Fax: +91 80 6782 3232

**USA**

Solartron Metrology  
USA Central Sales Office  
915 N. New Hope Road, Suite C  
Gastonia, NC 28054  
Tel: +1 800 873 5838  
Fax: +1 704 868 8466  
[usasales.solartronmetrology@ametek.com](mailto:usasales.solartronmetrology@ametek.com)

**China**

AMETEK Commercial Enterprise (Shanghai) Co. Ltd  
No. 155 Puhui Road  
Ju Ting Economic Development Zone  
Shanghai 200131, China  
Tel: +86 21 5763 2509  
Fax: +86 21 5866 0969 Ext. 261/262  
[china.solartronmetrology@ametek.com](mailto:china.solartronmetrology@ametek.com)



**Solartron  
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Offices worldwide  
Agent and distributor details  
available at  
[www.solartronmetrology.com](http://www.solartronmetrology.com)



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



**SCIGATE AUTOMATION (S) PTE LTD**

No. 1 Bukit Batok Street 22 #01-01 Singapore 659592

Tel: (65) 6561 0488

Fax: (65) 6562 0588

Email: [sales@scigate.com.sg](mailto:sales@scigate.com.sg)

Web: [www.scigate.com.sg](http://www.scigate.com.sg)

Business Hours: Monday - Friday 8.30am - 6.15pm

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