

Spring, Pneumatic Push and Vacuum Retract Probes

Contact gauge probes often provide the most cost effective solution for a wide range of measuring and positioning applications.

In a conventional pencil probe the tip is pushed out using an internal spring. When installed in a fixture it is frequently required to design a mechanism to bring the probe into contact with the part being measured.

A pneumatic probe (either pneumatic push or vacuum retract) allows the number of parts in the fixture to be reduced resulting in improved reliability and reduced fixture cost. It also allows for fast automatic loading of the part into the gauge as the probe tip can be in the fully 'retract position' when this is occurring. Probes such as the AX/5/1 have a mechanical movement of 10 mm with a calibrated range of ± 1 mm at the beginning of the movement.

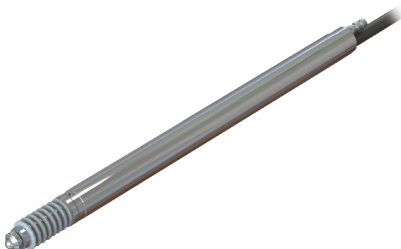


AX/S - Spring Push

- ▶ ± 0.25 , ± 0.5 , ± 1 , ± 1.5 , ± 2.5 , ± 5 & ± 10 mm Measuring ranges
- ▶ Accuracy as low as $1 \mu\text{m}$
- ▶ Up to $0.05 \mu\text{m}$ measurement repeatability
- ▶ Tip force 0.7N (options available)
- ▶ IP65 sealing
- ▶ Spring actuation

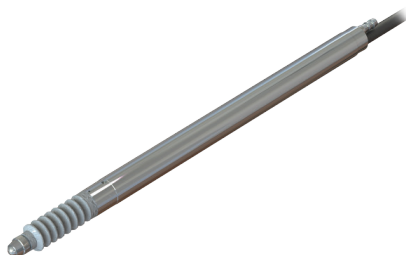
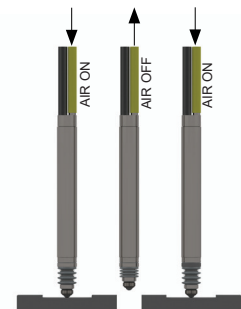


AX/0.25/S Probe



AX/P - Pneumatic Push

- ▶ ± 1 , ± 2.5 , ± 5 & ± 10 mm measuring ranges
- ▶ Accuracy as low as $1 \mu\text{m}$
- ▶ Up to $0.05 \mu\text{m}$ measurement repeatability
- ▶ Tip force 0.7N (options available)
- ▶ IP65 sealing
- ▶ Pneumatic gaiter actuation
- ▶ Vacuum retract options also available



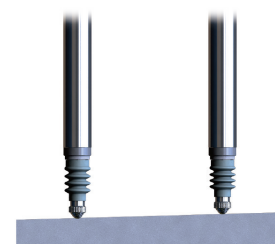
AJ/P - Jet Pneumatic Push

- ▶ ± 1 , ± 2.5 , ± 5 & ± 10 mm measuring ranges
- ▶ Same performance as standard pneumatic probes
- ▶ Pneumatic actuation using built in piston – separate from gaiter
- ▶ IP50 sealing

With conventional pneumatic transducers, the air pressure is contained within the gaiter. The Jet range pneumatic transducers are designed so that the gaiter is not pressurised. This has the advantage that gaiter damage will not affect operation resulting in less downtime and reduced cost of ownership.



Application: Diameter Check



Application: Flatness

Spring, Pneumatic Push and Vacuum Retract

Feather Touch Probes have been designed to gauge delicate surfaces, such as glass, thin sections, pharmaceutical products and tiny electro mechanical components. Whereas the traditional gauging probe exerts a force of 0.7N, the Feather Touch probe when operated horizontally exerts a mere 0.18N. This is achieved by replacing the naturally elastic gaiter with a close tolerance gland. On pneumatic versions air leakage through this gland is less than 2.5 ml per second at 1 bar pressure, avoiding surface contamination while still providing a degree of cleaning the probe bearing.



AT - Feather Touch

- ▶ ± 1 , ± 1.5 , ± 2.5 , ± 5 & ± 10 mm measuring ranges
- ▶ Accuracy as low as $1 \mu\text{m}$
- ▶ Up to $0.05 \mu\text{m}$ measurement repeatability
- ▶ Tip force 0.18N (options available)
- ▶ IP50 Sealing
- ▶ Spring actuation

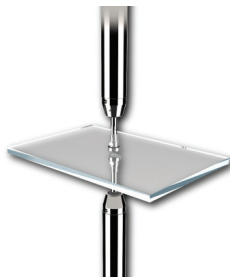


AW - Ultra low tip force

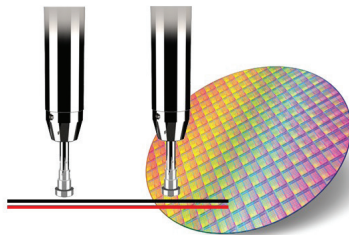
- ▶ ± 5 mm measuring ranges
- ▶ Accuracy as low as $1 \mu\text{m}$
- ▶ Up to $0.05 \mu\text{m}$ measurement repeatability
- ▶ Tip force as low as 0.03N
- ▶ IP50 Sealing
- ▶ Spring and pneumatic actuation



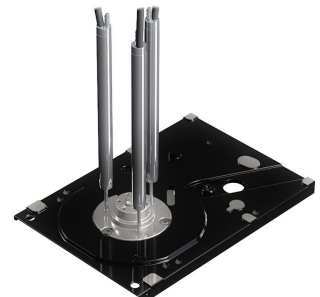
The Ultra Feather Touch probe has so light a tip force, it is a viable alternative to a non-contact sensor in many applications. With various tips available in ruby and nylon, the UFT is already being used to check glass, rubber, semi-conductor wafers and other delicate materials.



Application: Glass Thickness



Application: Semi Conductor Wafer



Application: Hard Disk Drive Case



A6G - Small Diameter Probes (06 mm)

- ▶ ± 1 measuring ranges
- ▶ Accuracy as low as $1 \mu\text{m}$
- ▶ Up to $0.05 \mu\text{m}$ measurement repeatability
- ▶ Tip force 0.7N
- ▶ IP65 Sealing
- ▶ Spring and pneumatic actuation

The A6G range of probes are only 6 mm diameter, but still incorporate a precision linear bearing, this allows probes to be closely packed together for accurate measurement of close features. For Pneumatic specifications please contact your local Solartron representative.

Technical Specifications

Products <i>(Note 1)</i>		Standard, Spring, Pneumatic and Feather Touch			
Spring Push Axial Cable		N/A	AX/0.5/S	AX/1/S	AX/1.5/S
Spring Push Radial Cable		AX/0.25/S	AXR/0.5/S	AXR/1/S	AXR/1.5/S
Spring Push Axial Cable Feather Touch		N/A	N/A	AT/1/S	AT/1.5/S
Spring Push Radial Cable Feather Touch		N/A	N/A	ATR/1/S	ATR/1.5/S
Pneumatic Axial Cable		N/A	N/A	AX/1/P	AX/1.5/P
Pneumatic Radial Cable		N/A	N/A	AXR/1/P	AXR/1.5/P
Pneumatic Axial Cable Feather Touch		N/A	N/A	AT/1/P	AT/1.5/P
Pneumatic Radial Cable Feather Touch		N/A	N/A	ATR/1/P	ATR/1.5/P
Pneumatic Axial Cable Jet		N/A	N/A	AJ/1/P	AJ/1.5/P
Pneumatic Radial Cable Jet		N/A	N/A	AJR/1/P	AJR/1.5/P
Measurement Performance					
Measurement Range (mm)		±0.25	±0.5	±1	±1.5
Linearity (% of Reading)	<i>(Note 2)</i>	0.50	0.50	0.50	0.50
Linearity (µm)	<i>(Note 2)</i>	0.25	0.5	1	1.5
Maximum Repeatability (µm)	<i>(Note 3)</i>	0.10	0.10	0.15	0.15
Typical Repeatability (µm)	<i>(Note 4)</i>	0.05	0.05	0.05	0.05
Resolution (µm)	<i>(Note 5)</i>				
Pre Travel (mm)	<i>(Note 6)</i>	0.03	0.03	0.15	0.15
Post Travel (mm)	<i>(Note 7)</i>	0.05	0.05	0.85	0.85
Pre Travel adjustment range (mm) (Spring Push Only)		None	0.50	1.00	1.50
Tip Force (N)	<i>(Note 8)</i>				
Spring Push ±20 %		0.70	0.70	0.70	0.70
Spring Push Feather Touch ±20 %		0.30	0.30	0.30	0.30
Pneumatic ±20 % at 0.4 bar		N/A	N/A	0.70	0.70
Pneumatic ±20 % at 1 bar		N/A	N/A	2.60	2.60
Pneumatic Feather Touch ±30 % at 0.4 bar		N/A	N/A	0.18	0.18
Pneumatic Feather Touch ±30 % at 1 bar		N/A	N/A	1.10	1.10
Ultra Feather Touch at 0.4 bar		N/A	N/A	N/A	N/A
Pneumatic Jet ±30 % at 1 bar		N/A	N/A	0.85	0.85
Temperature Coefficient %FS/°C		0.01	0.01	0.01	0.01
Electrical Interface <i>(Note 9)</i>					
LVDT Sensitivity - Plugged ±0.5% (mV/V/mm)		200	200	200	133
LVDT Sensitivity - Unplugged ±5% (mV/V/mm)		262	262	215	150
Half Bridge Sensitivity - Plugged ±0.5% (mV/V/mm)		73.5	73.5	73.5	49
Half Bridge Sensitivity - Unplugged ±5% (mV/V/mm)		82	82	83	82
LVDT Energising Current ±5% (mA/V)		2.2	2.2	1.8	2
Half Bridge Energising Current ±5% (mA/V)		1.2	1.2	1	1
Environmental					
Sealing for Probe					
Storage Temperature (°C)					
Operating Temperature (°C)					
Probe Life					Up to 100 million
Materials					
Probe Body					
Probe Tip Options					
Gaiter					
Cable					Standard 2 m length, Standard cable has PUR sheath, nylon braided,

- ▶ Note 1: Product descriptions shown are for LVDT probes. For Half Bridge add H to the end e.g. AX/1/SH
All performance parameters identical except sensitivity
- ▶ Note 2: Accuracy is either µm or % reading, whichever is greater
- ▶ Note 3: Repeated operation against a carbide target with side load applied to the tip, max - min result
- ▶ Note 4: Repeated operation against a carbide tip standard deviation from average (68%)
- ▶ Note 5: Resolution depends on the conditioning electronics used

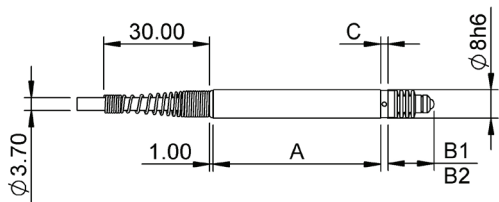
AX/2.5/S	AX/5/S	AX/10/S	AX/5/1/S	AW/5/S	A6G/1/S
AXR/2.5/S	AXR/5/S	AXR/10/S	AXR/5/1/S	N/A	N/A
AT/2.5/S	AT/5/S	AT/10/S	AT/5/1/S	N/A	N/A
ATR/2.5/S	ATR/5/S	ATR/10/S	ATR/5/1/S	N/A	N/A
AX/2.5/P	AX/5/P	AX/10/P	AX/5/1/P	AW5/P	N/A
AXR/2.5/P	AXR/5/P	AXR/10/P	AXR/5/1/P	N/A	N/A
AT/2.5/P	AT/5/P	AT/10/P	AT/5/1/P	N/A	N/A
ATR/2.5/P	ATR/5/P	ATR/10/P	ATR/5/1/P	N/A	N/A
AJ/2.5/P	AJ/5/P	AJ/10/P	AJ/5/1/P	N/A	A6J/1/P
AJR/2.5/P	AJR/5/P	AJR/10/P	AJR/5/1/P	N/A	N/A
±2.5	±5	±10	±1	±5	±1
0.50	0.50	0.70	0.50	0.50	0.50
2.5	5	10	5	5	1
0.15	0.15	0.15	0.15	0.15	0.15
0.05	0.07	0.10	0.05	0.07	0.05
0.15	0.15	0.15	0.15	0.15	0.15
0.85	0.85	0.85	8.85	0.85	0.35
1.50	1.50	None	None	None	None
0.70	0.70	0.70	0.70	N/A	0.70
0.30	0.30	0.30	0.30	0.03-0.06	N/A
0.70	0.70	0.70	N/A	N/A	0.70
2.60	2.60	2.60	N/A	N/A	N/A
0.18	0.18	0.18	N/A	N/A	N/A
1.10	1.10	1.10	N/A	N/A	N/A
N/A	N/A	N/A	N/A	0.03-0.06	N/A
0.85	0.85	0.85	N/A	N/A	1.0
0.01	0.01	0.01	0.01	0.01	0.02
80	40	20	200	40	200
150	105	33	20	105	269
29.4	14.7	7.35	73.5	14.4	73.5
82	51	33	83	51	88
2	2	1	1.8	2	3
1	1.2	1.2	1	1.2	1.2
IP65 with gaiter or IP50 without gaiter					
-20 to +80					
+5 to +80 with gaiter or -10 to +80 without gaiter					
cycles depending on application, typical 10 million in most applications					
Stainless Steel					
Nylon, Ruby, Silicon Nitride, Tungsten Carbide					
Fluoroelastomer or Silicon					
steel braided or armoured options available					

- ▶ Note 6: Distance from the fully out position to start of calibrated measuring range
- ▶ Note 7: Distance from the end of the calibrated measuring range to the fully in position
- ▶ Note 8: Tip force is at the mid point of the measuring range
- ▶ Note 9: LVDT probes are calibrated at 3 V, 5 kHz into a 10 kΩ load (100 kΩ unplugged). Half Bridge at 3 V, 10 kHz into a 2 kΩ load (1 kΩ unplugged). The probes will operate at energising voltages between 1 and 10 V and frequencies between 2 and 20 kHz, but the performance is not specified

Transducer Dimensions

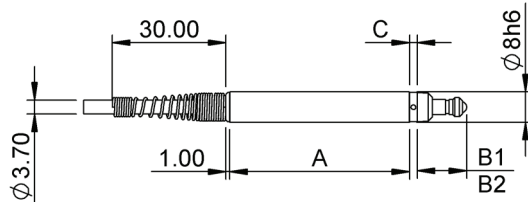
Standard Spring Push (AX/S(H))

	AX/1/S	AX5/1/S	AX/1.5/S	AX/2.5/S	AX/5/S	AX/10/S
A	43.00	75.00	58.00	63.00	87.00	127.00
C	4.00*	4.25*	4.50*	4.50*	4.50*	3.00*
B1	14.00	25.50	14.50	18.00	25.50	45.00
B2	11.00	14.50	10.50	12.00	14.50	24.00
D	29.50	61.50	44.50	49.50	73.50	113.50



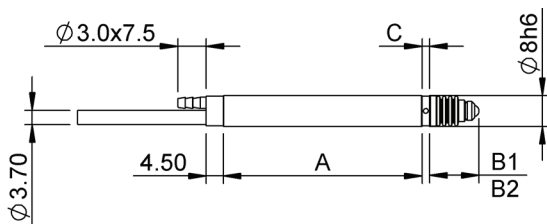
Feather Touch Spring Push (AT/S(H))

	AT/1/S	AT5/1/S	AT/1.5/S	AT/2.5/S	AT/5/S	AT/10/S
A	43.00	75.00	58.00	63.00	87.00	127.00
C	4.00*	4.25*	4.50*	4.50*	4.50*	3.00*
B1	14.00	25.50	14.50	18.00	25.50	34.00
B2	11.00	14.50	10.50	12.00	14.50	13.00
D	29.50	61.50	44.50	49.50	73.50	113.50



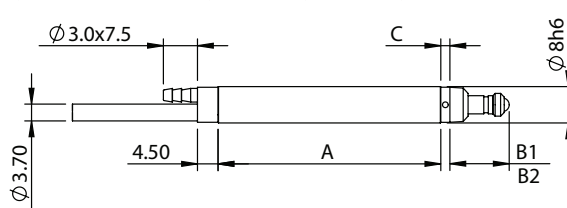
Pneumatic Push (AX/P(H))

	AX/1/P	AX5/1/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	14.25	25.50	18.00	25.50	45.00
B2	11.25	14.50	12.00	14.50	24.00
D	35.50	70.50	57.50	82.50	113.50



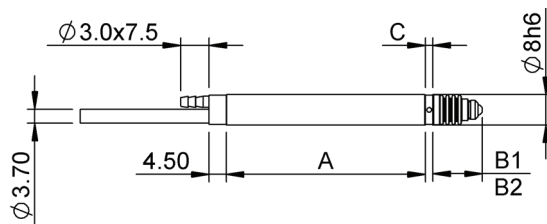
Feather Touch Pneumatic Push (AT/P(H))

	AT/1/P	AT5/1/P	AT/2.5/P	AT/5/P	AT/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	14.25	25.50	18.00	25.50	34.00
B2	11.25	14.50	12.00	14.50	13.00
D	35.50	70.50	57.50	82.50	113.50



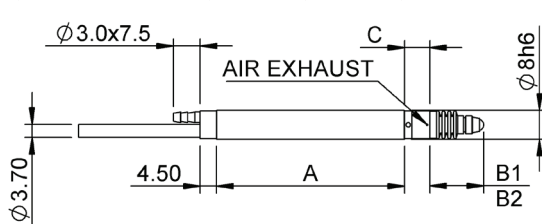
Vacuum Retract (AX/V(H))

	AX/1/V	AX5/1/V	AX/1.5/V	AX/2.5/V	AX/5/V	AX/10/V
A	43.00	75.00	58.00	63.00	87.00	127.00
C	4.00*	4.25*	4.50*	4.50*	4.50*	3.00*
B1	14.00	25.50	14.50	18.00	25.50	45.00
B2	11.00	14.50	10.50	12.00	14.50	24.00
D	29.50	61.50	44.50	49.50	73.50	113.50

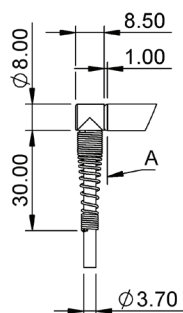


Gaiger Independent Pneumatic (AJ/P(H))

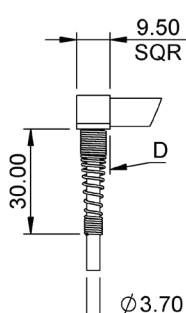
	AJ/1/P	AJ5/1/P	AJ/2.5/P	AJ/5/P	AJ/10/P
A	49.00	84.00	71.00	96.00	127.00
C	7.00	7.00	7.00	7.00	4.00*
B1	16.25	27.50	20.00	27.50	46.00
B2	13.25	16.50	14.00	16.50	25.00
D	35.50	70.50	57.50	82.50	113.50



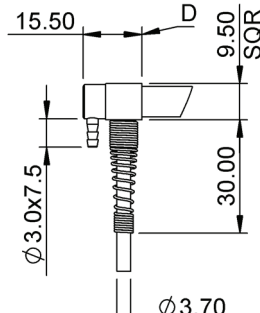
Radial Cable Outlet Plastic Adapter



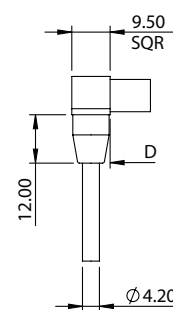
Radial Cable Outlet Fixed / Spring Push



Radial Cable Outlet Fixed / Pneumatic



Radial Cable Outlet St / Steel Braided

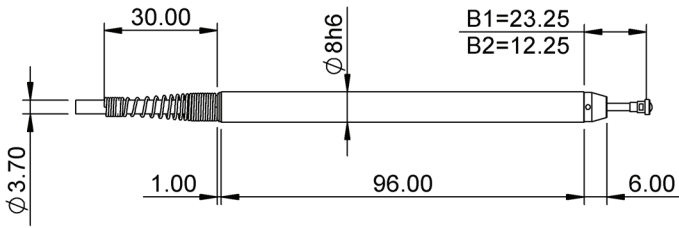


A - Case length for axial cable outlet
 B1 - Fully extended bearing assembly
 B2 - Fully retracted bearing assembly

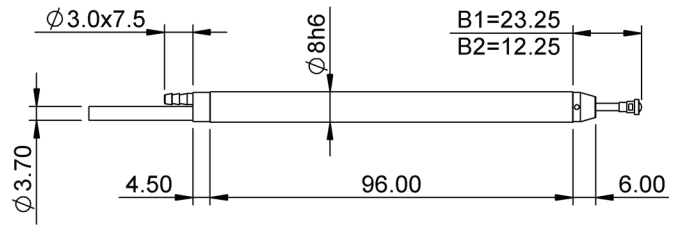
C - Fixed part of the bearing assembly,
 D - Case length for radial cable outlet only
 * - Variable dimension, tolerance ± 0.25 mm

Transducer Dimensions

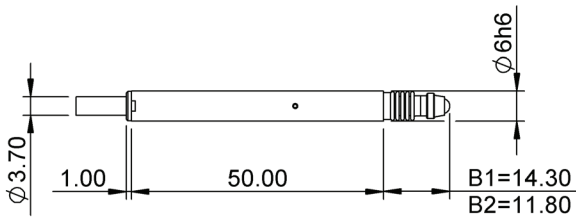
Ultra Feather Touch Spring Push (AW/S)



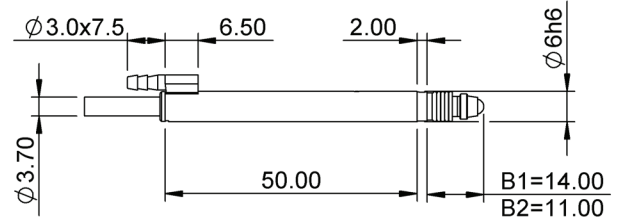
Ultra Feather Touch Pneumatic Push/Vacuum Retract (AW/P / AW/V)



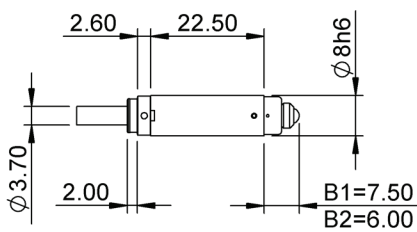
6mm Diameter Body Spring Push (A6G/S)



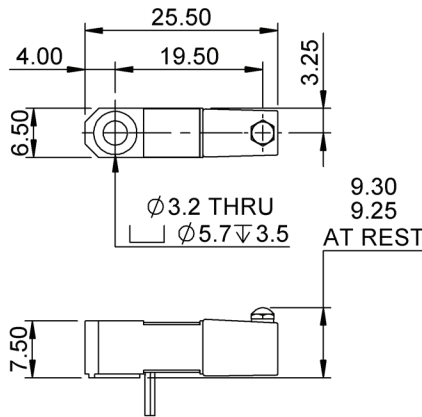
6mm Diameter Body Gaiter Independent Pneumatic Push (A6J/P)



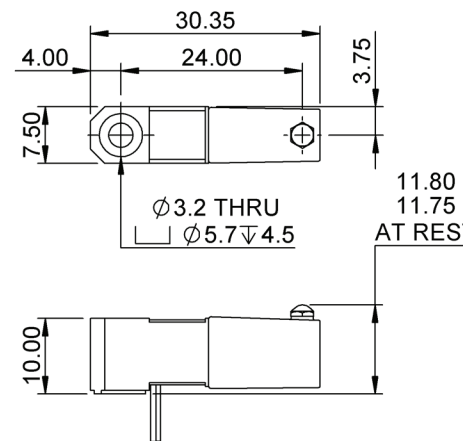
Miniature Spring Push (AX/0.5/S)



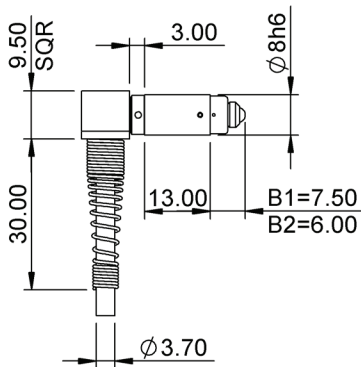
Mini Probe (AM/0.25/S)



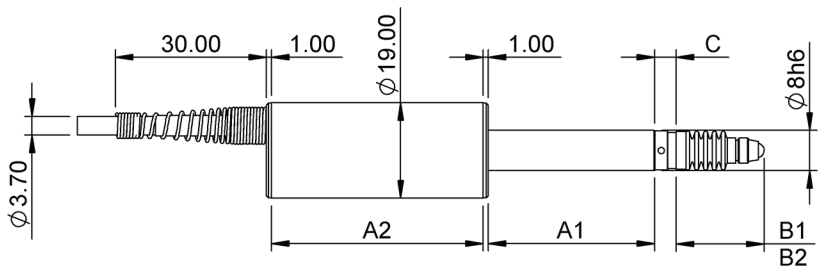
Mini Probe (AM/0.5/S)



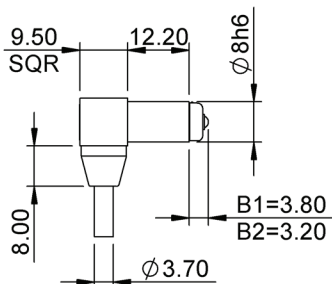
Miniature Spring Push (AXR/0.5/S)



G Series Spring Push (VG/IG/WG)



Miniature Spring Push (AX/0.25/S)



	VG/2/S WG/2/S	VG/5/S WG/5/S	VG/10/S WG/10/S	VG/20/S WG/20/S	IG/2/S	IG/5/S	IG/10/S	IG/20/S
A1	28.00	28.00	52.00	92.00	33.00	33.00	57.00	97.00
A2	47.00	47.00	47.00	47.00	42.00	42.00	42.00	42.00
B1	16.00	20.00	27.50	47.00	16.00	20.00	27.50	47.00
B2	13.00	14.00	16.50	26.00	13.00	14.00	16.50	26.00
C	3.75*	4.25*	4.25*	3.00*	3.75*	4.25*	4.25*	3.00*