

Displacement transducers



Regardless of whether a miniature displacement sensor is used within a semiconductor manufacturing process or a submersible transducer is monitoring the deformation of a structure in sea water, the need for reliability over long periods remains the same.

- > S-Series
- > Optimum series
- > MD micro series
- > SM series
- > DC miniature
- > Submersible



S series

50 Displacement transducers



Ø19mm



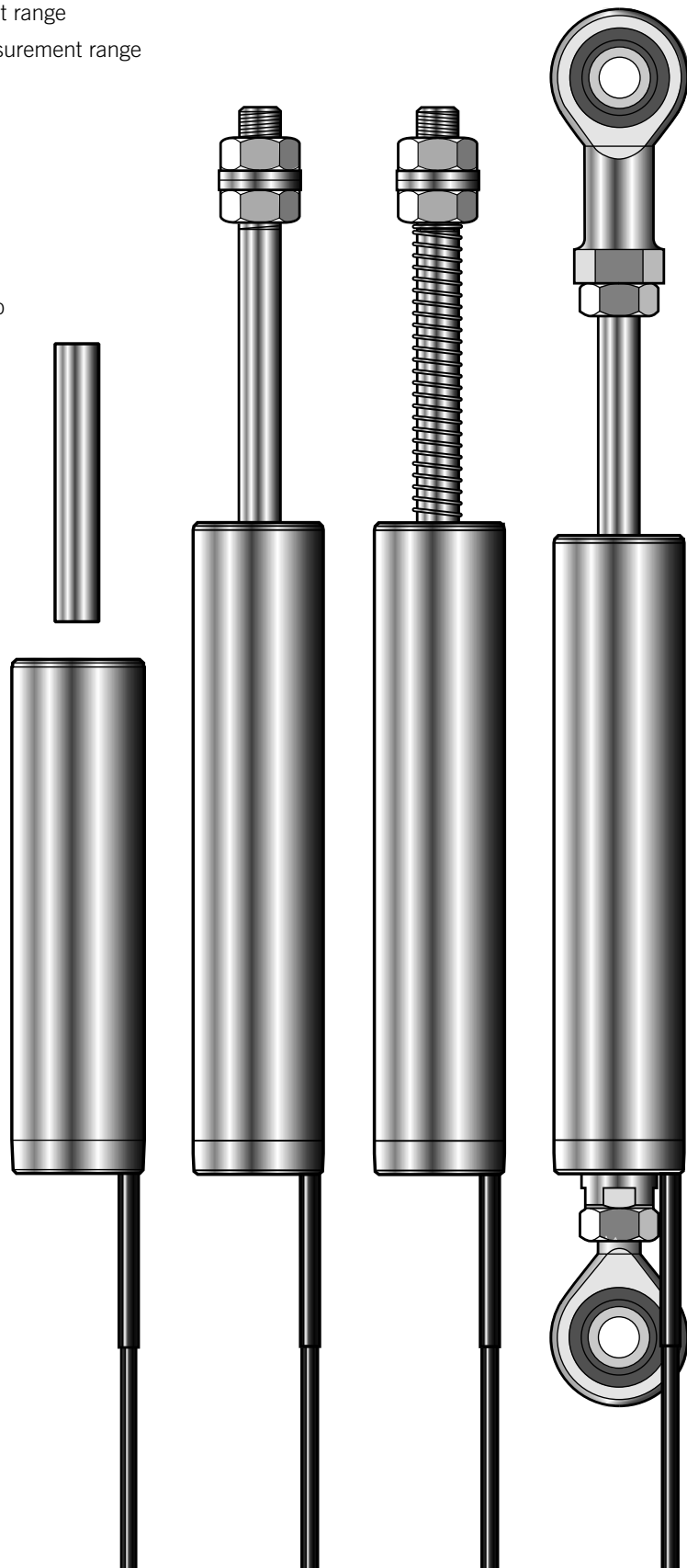
- > Digital options with 5mm to 150mm measurement range
- > Analogue options with ± 2.5 mm to ± 75 mm measurement range
- > DC and 4-20mA versions with integral electronics
- > $<0.2\%$ Linearity FRO
- > Hermetically sealed and submersible on request
- > IP67 protection
- > Rugged 19mm diameter stainless steel body
- > Rigid stainless steel carriers
- > Improved measurement range to body length ratio
- > Large bore to core clearance
- > Wide range of accessories

The S Series of Displacement Transducers is the culmination of many years' experience gained from Solartron Metrology's highly successful Mach One range plus careful note of market feedback. The result is a totally new range of transducers that is better able to satisfy today's demanding manufacturing and research applications.

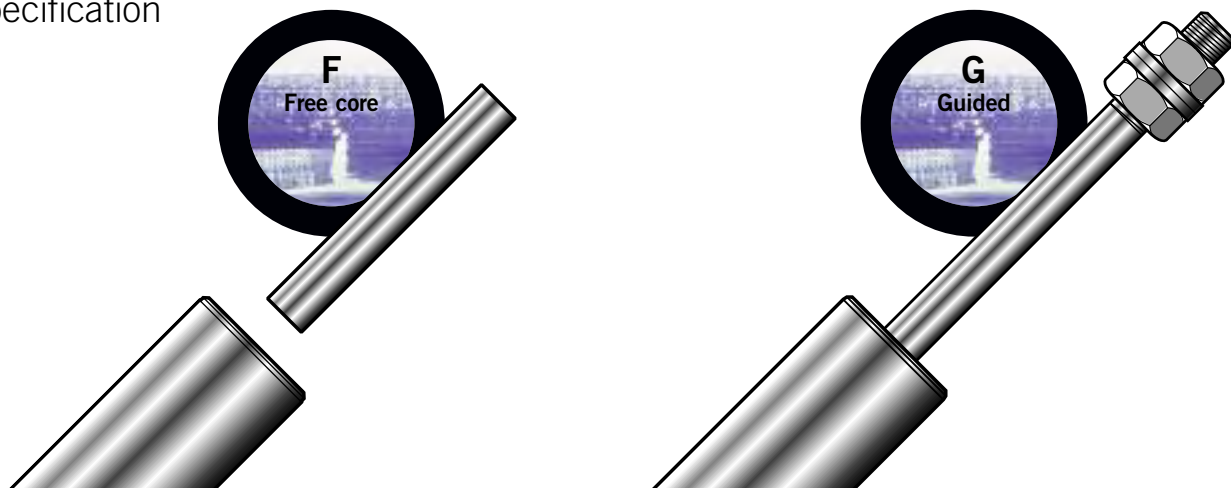
The need to transfer signals from the transducer to data acquisition and control systems reliably, quickly and cost effectively has been catered for with a complete new range of onboard or external analogue signal conditioning units and Orbit compatible modules for digital versions.

The Stainless Steel body with improved sealing to IP67 coupled with new polymer guides with rigid carriers, ensure that the transducers keep working accurately and reliably, especially in wet and corrosive conditions.

An unusually large bore to core clearance is maintained throughout the range, even on transducers fitted with onboard signal conditioning, enabling easier installation and making the assembly more forgiving of misalignment.



52 Specification



Product type	Analogue				Digital	Analogue				Digital
	LVDT	±5 V	0-10 V	4-20 mA		LVDT	±5 V	0-10 V	4-20 mA	
Free Core (F)	AS/2.5/F	VS/2.5/FB	VS/5/FU	IS/5/F	-	AS/5/F	VS/5/FB	VS/10/FU	IS/10/F	-
Guided (G)	AS/2.5/G	VS/2.5/GB	VS/5/GU	IS/5/G	DS/5/G	AS/5/G	VS/5/GB	VS/10/GU	IS/10/G	DS/10/G
Guided with Spring (S)	AS/2.5/S	VS/2.5/SB	VS/5/SU	IS/5/S	DS/5/S	AS/5/S	VS/5/SB	VS/10/SU	IS/10/S	DS/10/S
Guided with Universal Joints (U)	AS/2.5/U	VS/2.5/UB	VS/5/UU	IS/5/U	DS/5/U	AS/5/U	VS/5/UB	VS/10/UU	IS/10/U	DS/10/U
Measurement										
Measurement Range (mm)	±2.5		5			±5		10		
Linearity ¹ (%FRO)										
Resolution (µm)	see note ²				<0.1	see note ²				<0.1
Pre-travel ³ ±0.5 (mm)	1.25					2.25				
Post-travel ³ ±0.5 (mm)	1.60					2.60				
Tip Force ±20% (horiz. at mid position) (N)	1.00					1.00				
Spring Rate ±20% (N/mm)	0.090					0.076				
Temperature Coefficient (%FRO/°C)	<0.02					<0.01				
Mechanical										
Body length ±0.5 (mm free core)	33.5		72.5		33.5	53		92		53
Body length ±0.5 (mm guided)	55		94		55	74.5		113.5		74.5
Body Diameter (mm)	19.00 (+0, -0.2)									
Weight ⁴ ±5g (g)	58		72			66		80		
Core weight ⁴ ±1g (g)	2.6					5.0				
Electrical Interface -LVDT										
Sensitivity ±5% (mV/V/mm)	144	-	-	-	-	178	-	-	-	-
Energising current ±5% (mA)	1.0	-	-	-	-	2.6	-	-	-	-
Residual Voltage at Null Position (%FRO)	<0.5	-	-	-	-	<0.5	-	-	-	-

Environmental

Storage Temp: (°C) LVDT: -40 to +120 DC, 4-20mA & Digital: -20 to +85

Operating Temp: (°C) LVDT: -40 to +120 DC, 4-20mA: 0°C to 65°C
Digital: -40 to +120 (transducer only)

IP Rating: LVDT, DC, 4-20mA, Digital (transducer only): IP67

Vibration: Sinusoidal 10 to 50 Hz. 50Hz to 1 kHz
Amplitude 1 to 10 g rms linear. 10 g rms

Shock: Drop testing 1m onto a hard surface
Topple testing 10 times from each end onto hard surface

Digital Probe Interface Electronics (PIE)

Reading Rate: Up to 3906 readings/second

Bandwidth: Up to 460Hz dependent on noise performance required

Output: Serial communication-RS485 signal level (Solartron Orbit Protocol)

Storage Temp: (°C) -20 to +85

Operating Temp: (°C) 0 to +60

IP Rating: IP43

Electrical Interface-DC & 4-20mA

Input Voltage (VDC) 10 to 30

Output Ripple (%FRO) 0.02

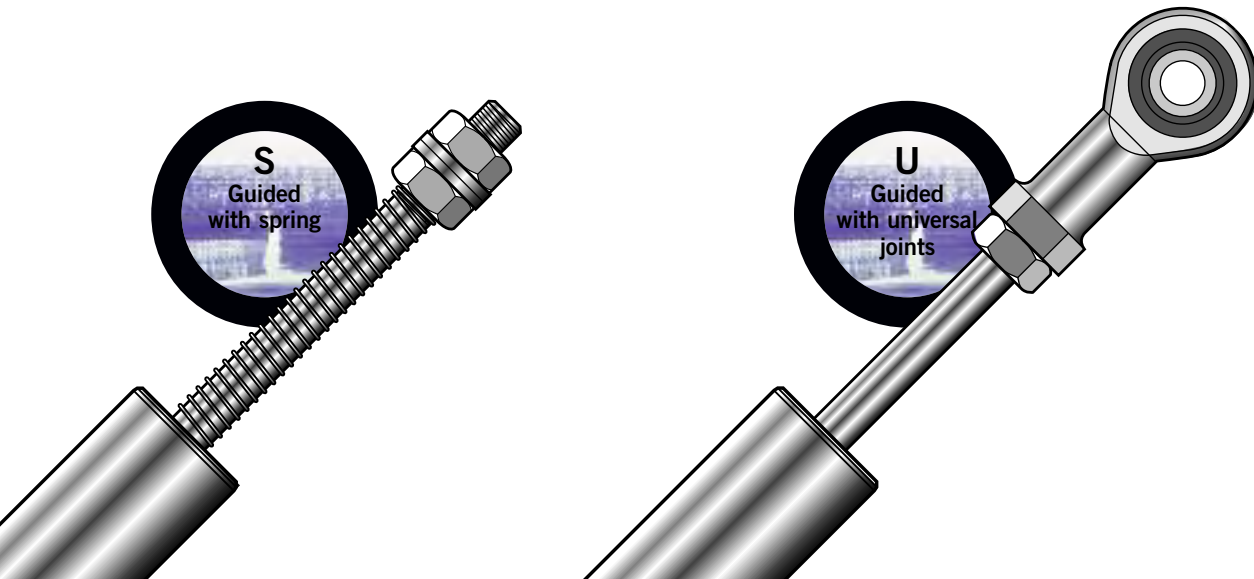
Bandwidth 500Hz (-3 dB)

Materials

Case 300 series Stainless Steel

Cable FEP

Core Nickel/Iron



Analogue				Digital	Analogue				Digital
LVDT	±5 V	0-10 V	4-20 mA		LVDT	±5 V	0-10 V	4-20 mA	
AS/7.5/F	VS/7.5/FB	VS/15/FU	IS/15/F	-	AS/10/F	VS/10/FB	VS/20/FU	IS/20/F	-
AS/7.5/G	VS/7.5/GB	VS/15/GU	IS/15/G	DS/15/G	AS/10/G	VS/10/GB	VS/20/GU	IS/20/G	DS/20/G
AS/7.5/S	VS/7.5/SB	VS/15/SU	IS/15/S	DS/15/S	AS/10/S	VS/10/SB	VS/20/SU	IS/20/S	DS/20/S
AS/7.5/U	VS/7.5/UB	VS/15/UU	IS/15/U	DS/15/U	AS/10/U	VS/10/UB	VS/20/UU	IS/20/U	DS/20/U
±7.5		15			±10		20		
±0.2					±0.2				
see note ²				<0.2	see note ²				<0.2
0.85					2.45				
1.20					2.90				
1.05					1.10				
0.057					0.048				
<0.01					<0.01				
60.2		99.2		60.2	74.5		113.5		74.5
81.7		120.7		81.7	96		135.0		96
19.00 (+0, -0.2)									
67		81			80		94		
5.8					7.2				
121	-	-	-	-	76	-	-	-	-
2.2	-	-	-	-	0.6	-	-	-	-
<0.5	-	-	-	-	<0.5	-	-	-	-

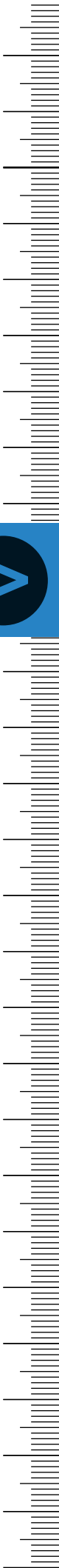
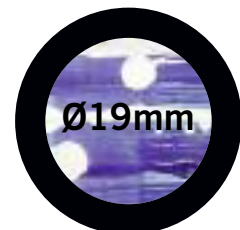


1 The linearity and electrical specification of the LVDT version is valid for the following conditions: energised at 3 V ±3mV r ms into a 100 kΩ load resistance configured with the centre ground at an excitation frequency of 5 kHz.

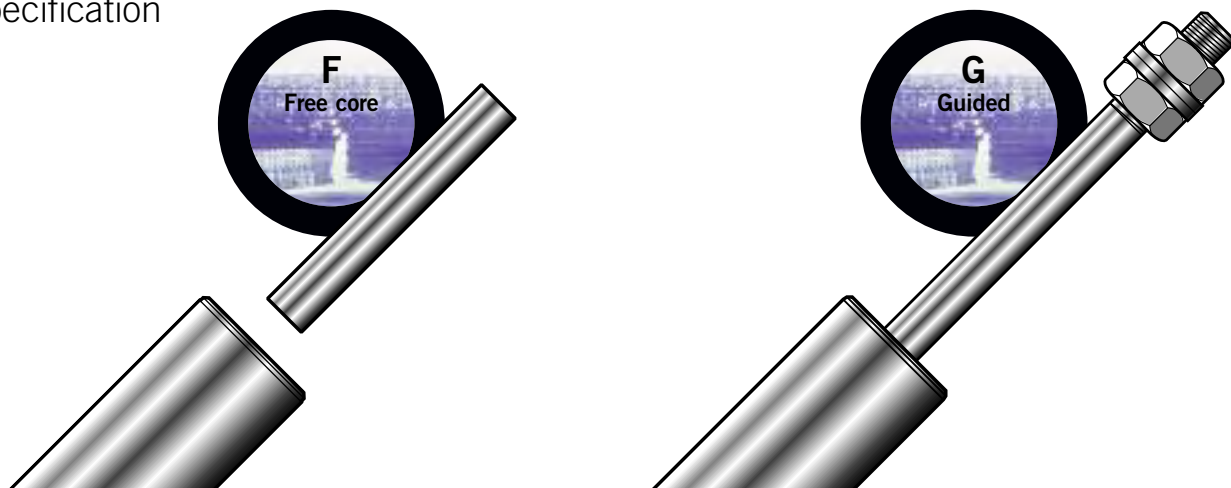
2 Dependent on associated electronics.

3 Guided versions and spring versions only.

4 Free core versions only. Weight for digital version is for probe only and excludes PIE.



54 Specification



Product type	Analogue				Digital	Analogue				Digital
	LVDT	±5 V	0-10 V	4-20 mA		LVDT	±5 V	0-10 V	4-20 mA	
Free Core (F)	AS/15/F	VS/15/FB	VS/30/FU	IS/30/F	-	AS/25/F	VS/25/FB	VS/50/FU	IS/50/F	
Guided (G)	AS/15/G	VS/15/GB	VS/30/GU	IS/30/G	DS/30/G	AS/25/G	VS/25/GB	VS/50/GU	IS/50/G	DS/50/G
Guided with Spring (S)	AS/15/S	VS/15/SB	VS/30/SU	IS/30/S	DS/30/S	AS/25/S	VS/25/SB	VS/50/SU	IS/50/S	DS/50/S
Guided with Universal Joints (U)	AS/15/U	VS/15/UB	VS/30/UU	IS/30/U	DS/30/U	AS/25/U	VS/25/UB	VS/50/UU	IS/50/U	DS/50/U
Measurement										
Measurement Range (mm)	±15		30			±25		50		
Linearity ¹ (%FRO)	±0.2					±0.2				
Resolution (µm)	see note ²				<0.3	see note ²				<0.5
Pre-travel ³ ±0.5 (mm)	5.95					6.15				
Post-travel ³ ±0.5 (mm)	6.30					6.60				
Tip Force ±20% (horiz. at mid position) (N)	1.25					1.50				
Spring Rate ±20% (N/mm)	0.035					0.031				
Temperature Coefficient (%FRO/°C)	<0.01					<0.01				
Mechanical										
Body length ±0.5 (mm free core)	88.9		127.9		88.9	110.4		149.4		110.4
Body length ±0.5 (mm guided)	110.4		149.4		110.4	131.9		170.9		131.9
Body Diameter (mm)	19.00 (+0, -0.2)									
Weight ⁴ ±5g (g)	92		106			110		124		
Core weight ⁴ ±1g (g)	6.4					6.6				
Electrical Interface -LVDT										
Sensitivity ±5% (mV/V/mm)	60	-	-	-	-	21	-	-	-	-
Energising current ±5% (mA)	1.5	-	-	-	-	0.5	-	-	-	-
Residual Voltage at Null Position (%FRO)	<0.5	-	-	-	-	<0.5	-	-	-	-

Environmental

Storage Temp: (°C)	LVDT: -40 to +120 DC, 4-20mA & Digital: -20 to +85
Operating Temp: (°C)	LVDT: -40 to +120 DC, 4-20mA: 0°C to 65°C Digital: -40 to +120 (transducer only)
IP Rating:	LVDT, DC, 4-20mA, Digital (transducer only): IP67
Vibration: Sinusoidal	10 to 50 Hz. 50Hz to 1 kHz
Amplitude	1 to 10 g rms linear. 10 g rms
Shock:	Drop testing 1m onto a hard surface Topple testing 10 times from each end onto hard surface

Digital Probe Interface Electronics (PIE)

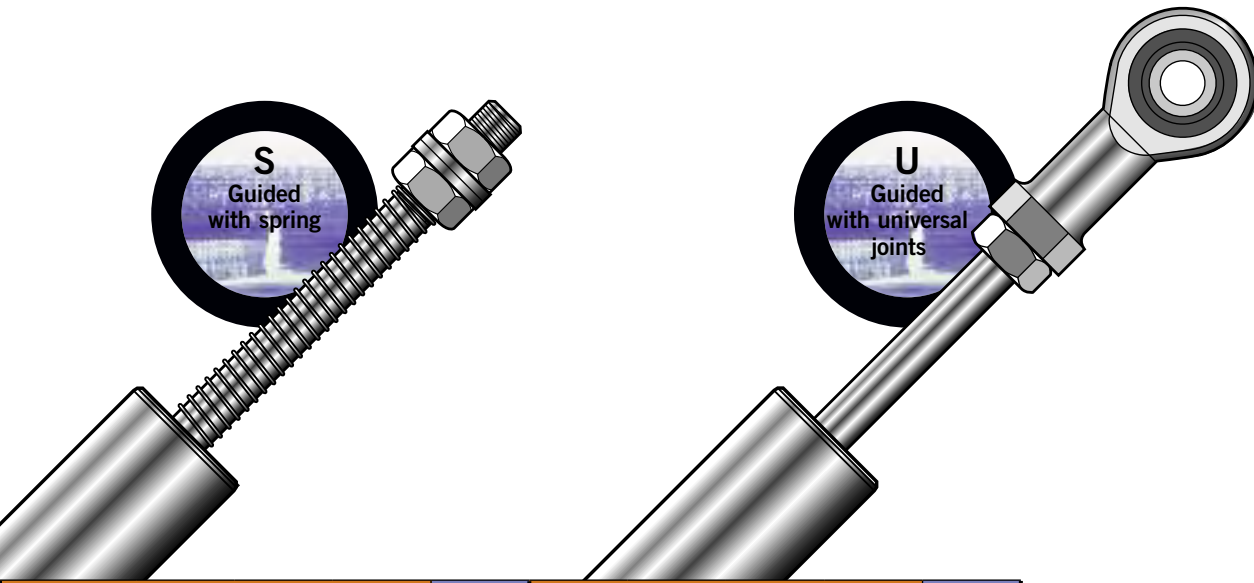
Reading Rate:	Up to 3906 readings/second
Bandwidth:	Up to 460Hz dependent on noise performance required
Output:	Serial communication-RS485 signal level (Solartron Orbit Protocol)
Storage Temp: (°C)	-20 to +85
Operating Temp: (°C)	0 to +60
IP Rating:	IP43

Electrical Interface-DC & 4-20mA

Input Voltage (VDC)	10 to 30
Output Ripple (%FRO)	0.02
Bandwidth	500Hz (-3 dB)

Materials

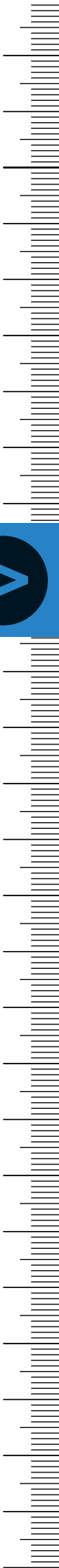
Case	300 series Stainless Steel
Cable	FEP
Core	Nickel/Iron



Analogue				Digital	Analogue				Digital
LVDT	±5 V	0-10 V	4-20 mA		LVDT	±5 V	0-10 V	4-20 mA	
AS/50/F	VS/50/FB	VS/100/FU	IS/100/F		AS/75/F	VS/75/FB	VS/150/FU	IS/150/F	
AS/50/G	VS/50/GB	VS/100/GU	IS/100/G	DS/100/G	AS/75/G	VS/75/GB	VS/150/GU	IS/150/G	DS/150/G
AS/50/S	VS/50/SB	VS/100/SU	IS/100/S	DS/100/S	AS/75/S	VS/75/SB	VS/150/SU	IS/150/S	DS/150/S
AS/50/U	VS/50/UB	VS/100/UU	IS/100/U	DS/100/U	AS/75/U	VS/75/UB	VS/150/UU	IS/150/U	DS/150/U
±50		100			±75		150		
±0.2					±0.2				
see note ²				<1	see note ²				<2
4.25					4.35				
4.60					4.70				
1.75					1.60				
0.021					0.012				
<0.01					<0.015				
168		207		168	218.2		257.2		218.2
189.5		228.5		189.5	239.7		278.7		239.7
19.00 (+0, -0.2)									
153		167			167		181		
9.0					9.0				
15	-	-	-	-	10	-	-	-	-
0.6	-	-	-	-	2.5	-	-	-	-
<0.5	-	-	-	-	<0.5	-	-	-	-



- 1 The linearity and electrical specification of the LVDT version is valid for the following conditions: energised at 3 V ±3mV r ms into a 100 kΩ load resistance configured with the centre ground at an excitation frequency of 5 kHz.
- 2 Dependent on associated electronics.
- 3 Guided versions and spring versions only.
- 4 Free core versions only.



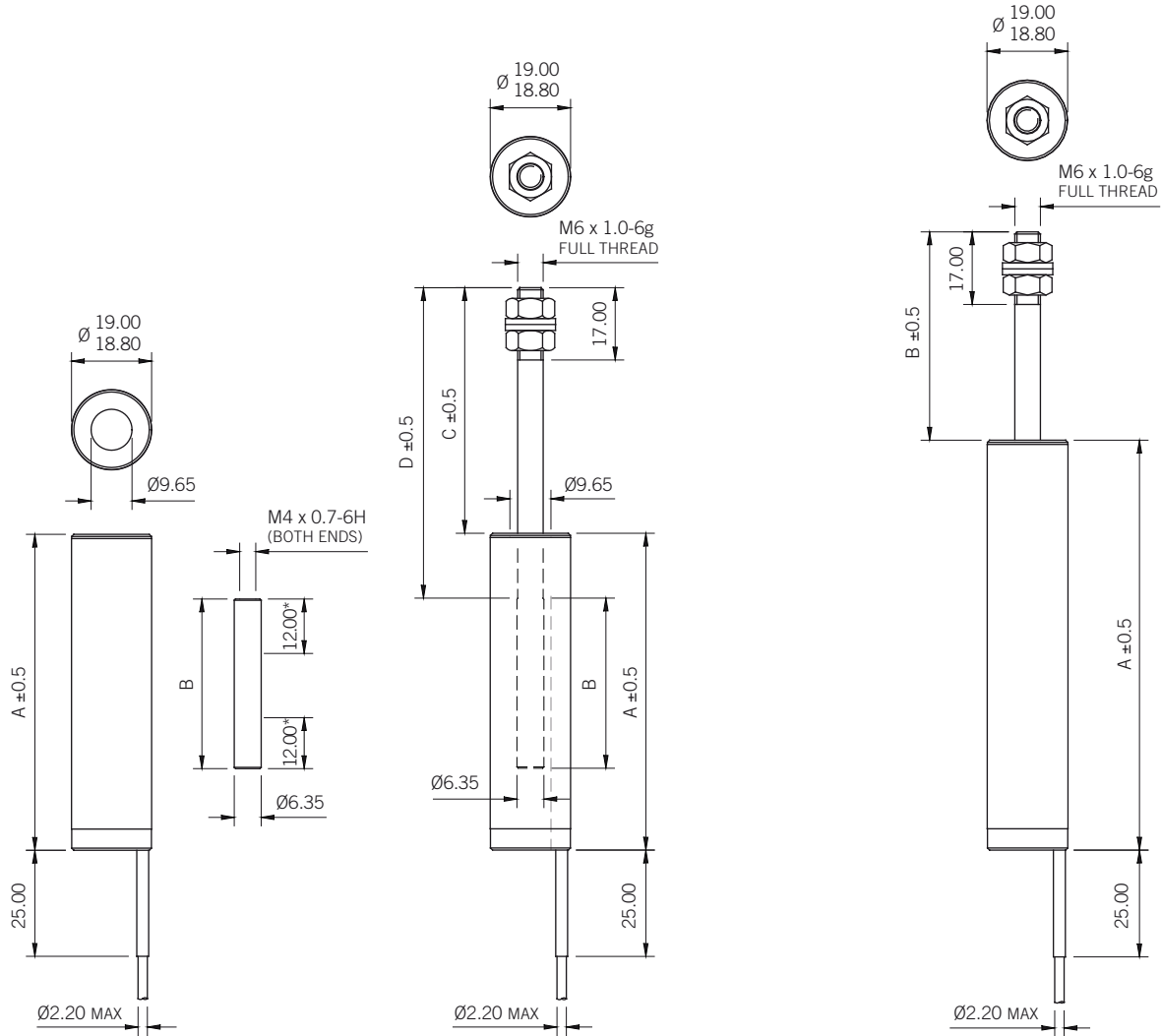
Dimensions (mm)

56

Free Core

Free Core with Carrier

Guided

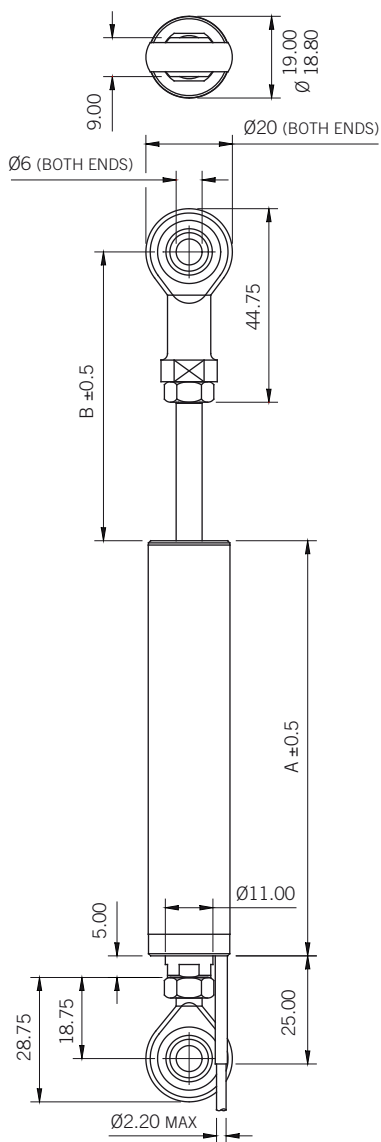


	Free Core	'A' body length	'B' core length	'C' at null	'D'
Free Core with Carrier					
AS/2.5/F		35.5	16.5	40.5	47.0
AS/5/F		53.0	29.0	48.0	58.0
AS/7.5/F		60.2	34.0	50.9	62.0
AS/10/F		74.5	40.0	57.75	73.0
AS/15/F		88.9	37.5	67.3	91.0
AS/25/F		110.4	38.5	80.05	114.0
AS/50/F		168.0	50.0	115.0	172.0
AS/75/F		218.2	50.0	160.9	243.0
VS/2.5/FB, VS/5/FU, IS/5/F		72.5	16.5	40.5	47.0
VS/5/FB, VS/10/FU, IS/10/F		92.0	29.0	48.0	58.0
VS/7.5/FB, VS/15/FU, IS/15/F		99.2	34.0	50.9	62.0
VS/10/FB, VS/20/FU, IS/20/F		113.5	40.0	57.75	73.0
VS/15/FB, VS/30/FU, IS/30/F		127.9	37.5	67.3	91.0
VS/25/FB, VS/50/FU, IS/50/F		149.4	38.5	80.05	114.0
VS/50/FB, VS/100/FU, IS/100/F		207.0	50.0	115.0	172.0
VS/7.5/FB, VS/150/FU, IS/150/F		257.2	50.0	160.9	243.0

* 12 mm dimensions not applicable for AS/2.5/F, VS/2.5/F, VS/5/FU and IS/5/F

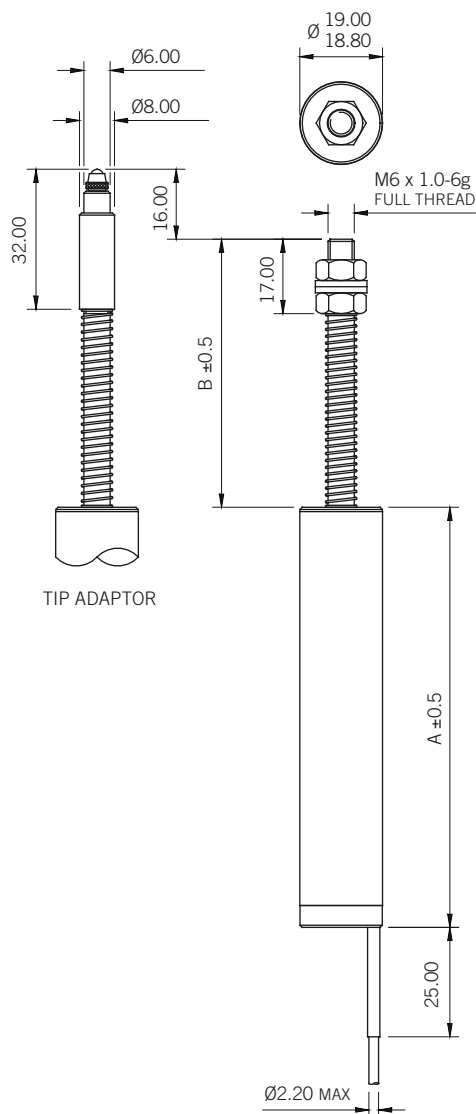
	Guided	'A' body length	'B1' fully extended	'B2' at null	'B3' fully retracted
AS/2.5/G, DS/5/G		55.0	35.25	31.5	27.4
AS/5/G, DS/10/G		74.5	46.25	39.0	31.4
AS/7.5/G, DS/15/G		81.7	20.25	41.9	33.2
AS/10/G, DS/20/G		96.0	61.25	48.8	35.9
AS/15/G, DS/30/G		110.4	79.25	58.3	37.0
AS/25/G, DS/50/G		131.9	102.25	71.1	39.5
AS/50/G, DS/100/G		189.5	160.25	106.0	51.4
AS/75/G, DS/150/G		239.7	231.25	151.9	72.2
VS/2.5/GB, VS/5/GU, IS/5/G		94.0	35.25	31.5	27.4
VS/5/GB, VS/10/GU, IS/10/G		113.5	46.25	39.0	31.4
VS/7.5/GB, VS/15/GU, IS/15/G		120.7	50.25	41.9	33.2
VS/10/GB, VS/20/GU, IS/20/G		135.0	61.25	48.8	35.9
VS/15/GB, VS/30/GU, IS/30/G		149.4	79.25	58.3	37.0
VS/25/GB, VS/50/GU, IS/50/G		170.9	102.25	71.1	39.5
VS/50/GB, VS/100/GU, IS/100/G		228.5	160.25	106.0	51.4
VS/7.5/GB, VS/150/GU, IS/150/G		278.7	231.25	151.9	72.2

Guided with Universal Joints



Universal joints	'A' body length	'B1' fully extended	'B2' at null	'B3' fully retracted
AS/2.5/U, DS/5/U	55.0	53.25	49.5	45.4
AS/5/U, DS/10/U	74.5	64.25	57.0	49.4
AS/7.5/U, DS/15/U	81.7	68.25	59.9	51.2
AS/10/U, DS/20/U	96.0	79.25	66.8	53.9
AS/15/U, DS/30/U	110.4	97.25	76.3	55.0
AS/25/U, DS/50/U	131.9	120.25	89.1	57.5
AS/50/U, DS/100/U	189.5	178.25	124.0	69.4
AS/75/U, DS/150/U	239.7	249.25	169.9	90.2
VS/2.5/UB, VS/5/UU, IS/5/U	94.0	53.25	49.5	45.4
VS/5/UB, VS/10/UU, IS/10/U	113.5	64.25	57.0	49.4
VS/7.5/UB, VS/15/UU, IS/15/U	120.7	68.25	59.9	51.2
VS/10/UB, VS/20/UU, IS/20/U	135.0	79.25	66.8	53.9
VS/15/UB, VS/30/UU, IS/30/U	149.4	97.25	76.3	55.0
VS/25/UB, VS/50/UU, IS/50/U	170.9	120.25	89.1	57.5
VS/50/UB, VS/100/UU, IS/100/U	228.5	178.25	124.0	69.4
VS/7.5/UB, VS/150/UU, IS/150/U	278.7	249.25	169.9	90.2

Guided Spring Push



Guided Spring Push	'A' body length	'B1' fully extended	'B2' at null	'B3' fully retracted
AS/2.5/S, DS/5/S	55.0	35.25	31.5	27.4
AS/5/S, DS/10/S	74.5	46.25	39.0	31.4
AS/7.5/S, DS/15/S	81.7	20.25	41.9	33.2
AS/10/S, DS/20/S	96.0	61.25	48.8	35.9
AS/15/S, DS/30/S	110.4	79.25	58.3	37.0
AS/25/S, DS/50/S	131.9	102.25	71.1	39.5
AS/50/S, DS/100/S	189.5	160.25	106.0	51.4
AS/75/S, DS/150/S	239.7	231.25	151.9	72.2
VS/2.5/SB, VS/5/SU, IS/5/S	94.0	35.25	31.5	27.4
VS/5/SB, VS/10/SU, IS/10/S	113.5	46.25	39.0	31.4
VS/7.5/SB, VS/15/SU, IS/15/S	120.7	50.25	41.9	33.2
VS/10/SB, VS/20/SU, IS/20/S	135.0	61.25	48.8	35.9
VS/15/SB, VS/30/SU, IS/30/S	149.4	79.25	58.3	37.0
VS/25/SB, VS/50/SU, IS/50/S	170.9	102.25	71.1	39.5
VS/50/SB, VS/100/SU, IS/100/S	228.5	160.25	106.0	51.4
VS/7.5/SB, VS/150/SU, IS/150/S	278.7	231.25	151.9	72.2

* for spring push with tip add 16.0mm