

world leaders in the art of linear measurement



S-Series

Displacement Transducers

Datasheet
502686
issue 7
EDCR 18768

- <0.2% Linearity FSO
- 19mm Diameter Stainless Steel Body
- IP 65 or IP 67 Protection
- Improved measuring range to body length
- AC, DC, 4-20mA and Digital output versions
- Large Bore to core clearance
- Wide range of instruments & signal conditioning



The S-Series of Displacement Transducers is the culmination of many years of 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 options of IP65 or IP67, coupled with new polymer guides with rigid carriers, ensure that the transducers keep working accurately and reliably, especially in wet or 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.

		Mechanical										Electrical														
		Axial connector					Free Core					Guided core					Screw Mount					High Temp.				
		SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	SI 1000	SI 3000	SI 7000	
Remote signal conditioning	DRC	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
OD 2	OD 2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
OD 4	OD 4	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
OD 5	OD 5	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
BICM (15.0-15V)	BICM (15.0-15V)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
BICM (24V)	BICM (24V)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
TTL module	TTL module	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Orbit	Orbit	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	

Note! High Temperature
is for Transducers only



measuring range in mm

LVDT	+/- 2.5	+/- 5.0	+/- 7.5	+/- 10	+/- 15	+/- 25	+/- 50	+/- 75	+/- 100	+/- 150
DC/DC & 4-20 mA	0-5	0-10	0-15	0-20	0-30	0-50	0-100	0-150	0-200	0-300
Digital	0-5	0-10	0-15	0-20	0-30	0-50	0-100	0-150	0-200	0-300
Linearity FSO %										0.25

Electrical LVDT

Sensitivity (mV/V/mm) ± 5%

3V RMS at 5.0 kHz into 100k ohm

Energising current (mA/V) ± 5%

Residual Voltage at null (%FSO)

+/- 2.5	+/- 5.0	+/- 7.5	+/- 10	+/- 15	+/- 25	+/- 50	+/- 75	+/- 100	+/- 150
0-5	0-10	0-15	0-20	0-30	0-50	0-100	0-150	0-200	0-300
0-5	0-10	0-15	0-20	0-30	0-50	0-100	0-150	0-200	0-300

Electrical DC/DC & 4-20mA

Input Voltage (DC)

Output ripple (%FSO)

Bandwidth Hz (-3dB)

Environmental (transducer only)

Storage temperature LVDT

Operating temperature DC/DC & 4-20mA

Operating temperature LVDT

Operating temperature DC/DC & 4-20mA

Operating temperature Digital* (probe only)

Sealing

Temperature coefficient (%FSO/°C).

<0.02 to +/-2.5mm. <0.15 rest of range

Shock Drop test 1m onto hard surface

topple test x 10 onto hard surface

Vibration Sinusoidal

10Hz to 50Hz

1-10 g rms linear

50Hz to 1kHz

10 g rms

Mechanical Options

Guided core

Spring return

Connectors

Extra cable

Universal Joints

see ordering guide

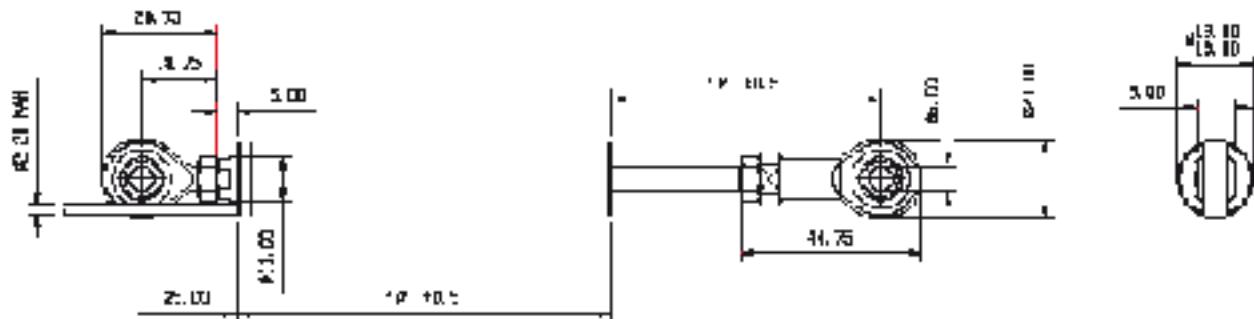
Material

Body 316 series Stainless Steel

Core Nickel/Iron

Cable FEP

Guided with Universal Joints



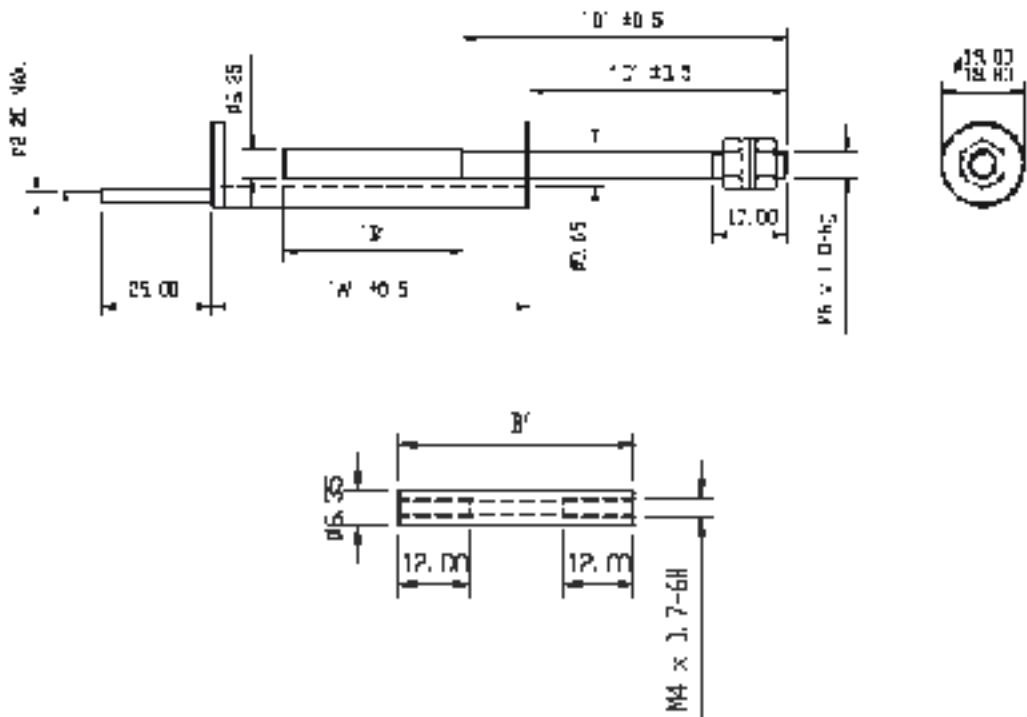
Guided with Universal Joints

A/C	'A' mm Body length	'B1' mm Fully Extended	'B2' mm At null	'B3' mm Retracted
± 2.5 mm	55	53.25	49.5	45.4
± 5 mm	74.5	64.25	57	49.4
± 7.5mm	81.7	68.25	59.9	51.2
± 10 mm	96	79.25	66.8	53.9
± 15 mm	110.4	97.25	76.3	55
± 25 mm	131.9	120.25	89.1	57.5
± 50 mm	189.5	178.25	124	69.4
± 75 mm	239.7	249.25	169.9	90.2
± 100 mm	297.2	309.23	201.18	93.08
± 150 mm	412	475	309.5	141.73

DC/DC & 4-20 mA

5 mm	94	53.25	49.5	45.4
10 mm	113.5	64.25	57	49.4
15 mm	120.7	68.25	59.9	51.2
20 mm	135	79.25	66.8	53.9
30 mm	149.4	97.25	76.3	55
50 mm	170.9	120.25	89.1	57.5
100 mm	228.5	178.25	124	69.4
150mm	278.7	249.25	169.9	90.2
200mm	336.2	309.23	201.18	93.08
300 mm	450.9	475	309.5	141.73

Free Core & Free Core with Carrier



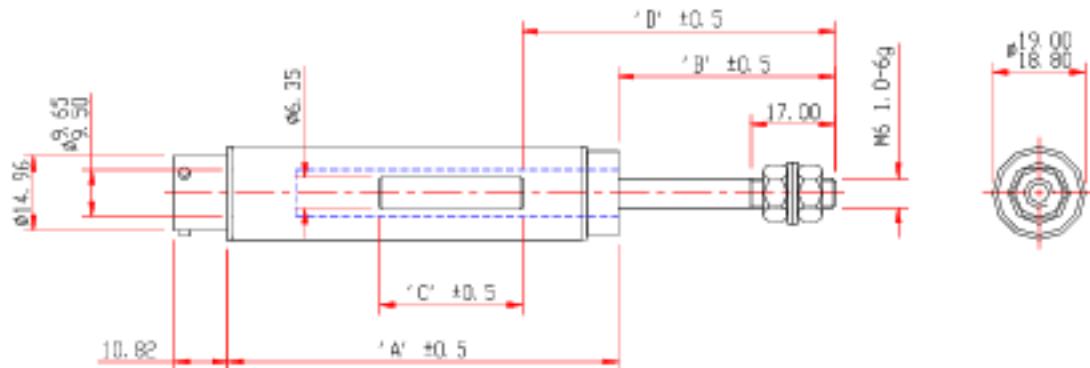
Free Core & Free Core with Carrier

A/C	'A' mm body length	'B' mm core length	'C' mm at null	'D' mm
± 2.5 mm	33.5	16.5	40.5	47
± 5 mm	53	29	48	58
± 7.5mm	60.2	34	50.9	62
± 10 mm	74.5	40	57.75	73
± 15 mm	88.9	37.5	67.3	91
± 25 mm	110.4	38.5	80.05	114
± 50 mm	168	50	115	172
± 75 mm	218.2	50	160.9	243
± 100 mm	275.7	50	192.15	303
± 150 mm	390.5	50	300.72	469

DC/DC & 4-20 mA

5 mm	72.5	16.5	40.5	47
10 mm	92	29	48	58
15 mm	99.2	34	50.9	62
20 mm	113.5	40	57.75	73
30 mm	127.9	37.5	67.3	91
50 mm	149.4	38.5	80.05	114
100 mm	207	50	115	172
150mm	257.2	50	160.9	243
200mm	314.7	50	192.15	303
300 mm	429.5	50	300.72	469

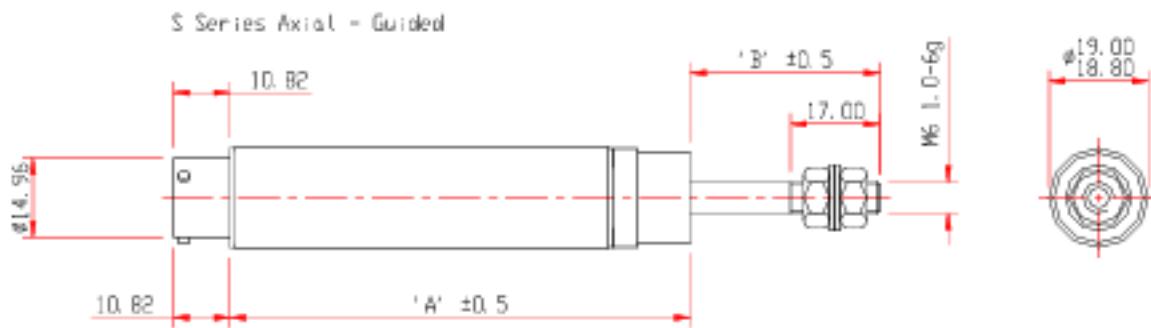
Free Core & Carrier Axial Connector



S Series Axial - Free Core & Carrier

Transducer Type	'A' mm Body Length	'B' mm At Null	'C' mm Core Length	'D' mm
Free Core & Carrier				
AC Version				
± 2.5mm	60.40	39.10	16.50	56.50
± 5mm	79.40	46.50	29.00	67.50
± 7.5mm	86.40	49.40	34.00	71.50
± 10mm	101.40	56.30	40.00	82.50
± 15mm	116.40	65.90	37.50	100.50
± 25mm	137.40	78.60	38.50	123.50
± 50mm	194.40	113.60	50.00	181.50
± 75mm	245.40	159.50	50.00	252.50
± 100mm	301.40	190.70	50.00	312.50
± 150mm	416.40	299.30	50.00	478.50
Free Core & Carrier				
DC/DC and 4-20mA				
5mm	93.40	39.10	16.50	56.50
10mm	110.40	46.50	29.00	67.50
15mm	119.90	49.40	34.00	71.50
20mm	134.40	56.30	40.00	82.50
30mm	148.40	65.90	37.50	100.50
50mm	170.40	78.60	38.50	123.50
100mm	227.40	113.60	50.00	181.50
150mm	278.40	159.50	50.00	252.50
200mm	333.40	190.70	50.00	312.50
300mm	448.30	299.30	50.00	478.50

Guided Core & Carrier Axial Connector



S Series Axial - Guided

Transducer Type	'A' mm Body Length	'B1' mm Extended	'B2' mm At Null	'B' mm Retracted
Guided				
AC and Digital				
± 2.5mm	68.40	40.60	32.60	27.60
± 5mm	87.40	51.00	40.00	30.50
± 7.5mm	94.40	55.00	42.90	32.40
± 10mm	109.40	66.00	49.80	35.00
± 15mm	124.40	84.00	59.30	36.10
± 25mm	145.40	107.00	72.10	38.60
± 50mm	202.40	165.00	107.10	50.70
± 75mm	253.40	236.00	153.00	71.40
± 100mm	309.40	296.00	184.20	73.90
± 150mm	424.40	462.00	292.80	125.00
Guided				
DC/DC and 4-20mA				
5mm	101.40	40.60	32.60	23.00
10mm	118.40	51.00	40.00	29.00
15mm	127.90	55.00	42.90	30.80
20mm	142.40	66.00	49.80	33.50
30mm	156.40	84.00	59.30	34.60
50mm	178.40	107.00	72.10	37.60
100mm	235.40	165.00	107.10	49.10
150mm	286.40	236.00	153.00	69.90
200mm	341.40	296.00	184.20	72.40
300mm	456.30	462.00	292.80	123.50

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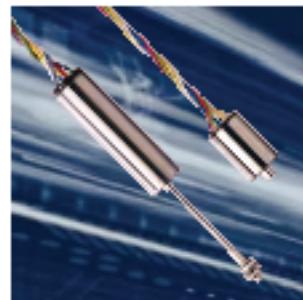
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Solartron pursues a policy of continuous development. Specifications in this document may therefore be changed without notice.

SM/MD/DF series

Miniature displacement sensors

SM



- Rugged construction
- Short body length
- Good performance

SM sensors cover two standard types in two measurement ranges $\pm 1\text{mm}$ and $\pm 3\text{mm}$. They are designed for measuring displacement in applications where infinite resolution and precise repeatability is required in a very small size.

The coils are wound on a PPS (40% GL) former and housed in a stainless steel case. The epoxy bonded construction makes the device suitable for operation in wet and oily environments and in applications with high levels of mechanical stress.

The core carrier assembly moves friction free within the sensor; an alternative option where the core is provided threaded at both ends is available allowing the user to manufacture their own carrier interface. Recommended carrier material is titanium.

MD

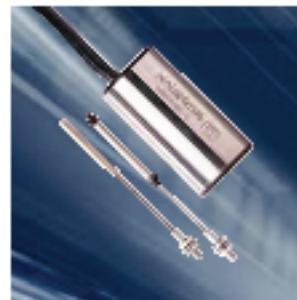


- Small diameter
- Right angle cable outlet option
- Low core weight
- Screened cable

The small case diameter (6mm and 8mm) allows for easy installation in confined spaces. A right angle output facility is available as a retrofit for the 8mm version.

The low core weight makes this range ideal for use in low inertia systems. Cross talk is prevented by the screened cable, which also allows for multiple use of these sensors in close proximity.

DF



- Measurement range to 10mm
- High Output
- Excellent repeatability
- Low power

The DF dc miniature displacement sensor has a friction-free core and the DFg has a free guided core incorporating Delrin bearings. All types incorporate a linear variable differential transformer (LVDT) as the measuring source together with oscillator, demodulator and filter providing a self-contained unit accepting a DC input and providing a DC output relative to armature position.

With high linearity and low mass of moving parts, these are ideally suited to applications in civil, mechanical, chemical and production engineering. Also, when mounted in a suitable load-sensitive member such as a proof ring or diaphragm, they can provide load or pressure measurement.

Sensor

LVDT with Free Core	SM1	SM3	MD01	MD1	MD2.5	MD3	MD10		-	
Half Bridge (HB) with Free Core		-	MD01H	MD1H	MD2.5H	MD3H	MD10H		-	
DC Output with Free Core				-				DP1	DP2.5	DP5
DC Output with Guided Core				-				DPg1	DPg2.5	DPg5

Measurement

Measurement Range [mm]	± 1	± 3	± 1	± 1	± 2.5	± 5	± 10	± 1	± 2.5	± 5
Linearity (% FSO)	0.25								0.30	
Linearity (% Reading)	-					0.5				
Resolution μm^1				<0.1			<0.2			see Note 1
Temperature Coefficient ($\text{m}^\circ\text{C}^{-1}$)	<0.00%				<0.01%					<0.025%

Mechanical

Body diameter (mm)	9.12	12.6		8.65					19.0
Case Material					400 Stainless Steel				
Cable Type:					PU				
Screened cable Length (m)	0.5			2					3
Screened cable Style	A				B				
Nominal Mass (g)	6.0	8.0	2.6	5.0	7.6	8.5	13.0	26.0	30.0
Nominal Mass of Moving Parts (g)	0.50	1.50	0.10	0.20	0.20	0.70	1.00	1.00	1.20

Environment

Operating Temperature ($^\circ\text{C}$)	-40 to +85		-10 to +80		-5 to +70
Storage Temperature ($^\circ\text{C}$)	-40 to +100		-40 to +105		-10 to +80
Sealing			Splash Proof		

Electrical Interface

Exciting Voltage	1-10 (Vrms)							17-24 (VDC)	
	3.6	1.8	3.0	1.8	2.0	1.0	0.6		-
Exciting Current (5Hz) (mA)	-		1.2	1.0	-	1.2	-		
Exciting Current (10Hz) (mA)					-			10	15
Frequency Response (-3db) (Hz)					Depends on Conditioning Electronics			50	75
Sensitivity at 10VDC $\pm 10\%$ mW/mm					-			75	50
Sensitivity at 5Hz $\pm 10\%$ mW/mm	142	136	269	210	150	105	50		-
Sensitivity (Hz) at 10VDC $\pm 10\%$ mW/mm	-	88	83	82	51	33			

Note 1: Resolution specification is only applicable to ORBIT digital sensors.
The resolution of LVDT sensors is effectively infinite and is only limited by the conditioning electronics.

Cable Style A comprises of individual twisted cores

Cable Style B comprises a sheathed and screened cable

Also see..

Dimensions and drawings

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Optimum series

Narrow bodied high performance sensors

- Good measurement range to body length ratio
- Small body diameter
- Larger radial bore clearance
- Rugged Construction

The Optimum Series of LVDT sensors is an ideal choice for process control and research applications. The free core variants are designed for precise linear positioning and measurement of moving parts where zero friction and hysteresis is required within a restricted space.

The free core version is available with an optional light weight core for mounting on to small, rapidly moving structures without affecting their performance and integrity - important in some control applications.

The lightweight core has a 1.9mm diameter which improves core to bore clearance, making alignment easier. A light titanium core carrier can be supplied on request.

The Optimum is also available as a guided product and with universal joints either as an LVDT or Digital product for use in applications where it is not possible to mount the core and carrier on the moving part.

Note: the Optimum can be wired as either differential output or unidirectional (except OP/10)



Sensor	OP1.5/P	OP5/P	OP10/P	OP12.5/P	OP25/P
LVDT Free Core					
LVDT Guided	OP1.5/G	OP5/G	OP10/G	OP12.5/G	OP25/G
ORBIT Digital Guided	DO/S	DO/T2	DO/20	DO/25	DO/50
Measurement					
Measurement Range (LVDT/Digital) (mm)	±1.5 / 3	±6 / 12	±10 / 20	±12 / 24	±25 / 50
Total mechanical travel ±0.5 (mm)	3.6	15.2	23.2	29.8	TBA
Pre-travel (guided only) (mm)	1.78	1.53	1.53	2.30	TBA
Linearity (% FSO)			<0.25		
Resolution μm		<0.1		<0.2	<0.4
Temperature Coefficient ($^\circ\text{C}^{-1}$)				<0.05%	
Mechanical					
Body diameter (mm)				9.52	
Case Material				400 Series Stainless Steel	
Tip Force ±20% (Horizontal at middle of range) N	66	94	94	90	TBA
Cable Type:				FEP	
Screened cable Length (m)				5 (max)	
Screened cable Style				A or B	
Nominal Mass (g)	7	12	12	20	TBA
Nominal Mass of Moving Part (g)	1.5	2.5	2.0	3.5	TBA
Environment					
Operating Temperature (Sensor) ($^\circ\text{C}$)				-40 to +150	
Storage Temperature (Sensor) ($^\circ\text{C}$)				-40 to +150	
Sealing				IP65	
Electrical Interface (LVDT)					
Operating Voltage				1-10 (Vrms)	
Operating Current 50-Hz (mA/V)	6	4.5	3.2 at 20 kHz	7	TBA
Frequency Response (Sidel) Hz				Depends on Electronics and Sensor Configuration	
Sensitivity at 5kHz ±10% mV/mm	108	78	85 at 20 kHz	69	TBA
Zero phase frequency (Hz)	13.1	24.1	>20	24.8	TBA
Electrical Interface (Orbit)					
Bandwidth				Up to 400 Hz (selectable)	
Output				Solartron Orbit	
Power (VDC)				5 ± 0.25 (± 0.06A)	
Sealing				IP65	
Weight (grams)	Probe interface electronics			52	
	Connector (including DIN rail adapt)			46	

Note 1: Resolution specification is only applicable to ORBIT digital sensors.
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Cable Style A comprises of individual twisted cores
Cable Style B comprises a shielded and screened cable

Also see..

[Sensor dimensions/drawings](#)

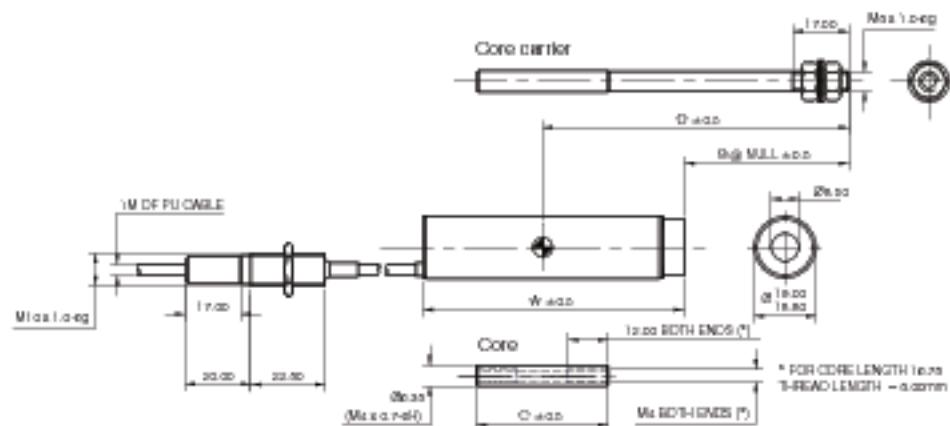
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[Orbit interface dimensions/drawings](#)

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SR series dimensions (mm)

MI Cable / Free Core

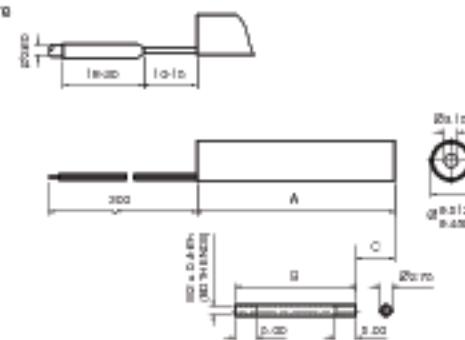


A = Body length
 B = Center Position From Front Face at Mid Range (null)
 C = Core Length
 D = Null Point to End of Central Mid Range

Range (mm)		MI Cable Free Core			
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All	
		A	A	B	C
±2.5	5	55.0	93.4	37.5	16.75
±5	10	74.5	112.5	45.7	29.00
±7.5	15	82.0	120.0	47.0	31.50
±10	20	96.5	134.5	54.5	39.00
±15	30	110.5	148.5	64.9	37.50
±25	50	132.5	170.5	77.2	56.50
±50	100	159.5	225.2	112.6	50.00
±75	150	240.5	276.5	157.8	50.00
					276.0

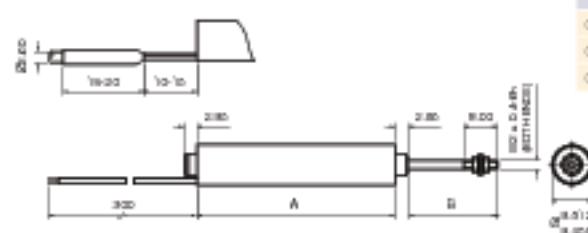
Optimum series dimensions (mm)

Free core



Type	A	B	C (mm)
OPT1.5	20.00	11.00	4.00
OPT6.0	46.50	26.40	9.05
OPT12.5	63.50	50.80	16.35

Guided core



Type	A	B (mm)	C (mm)
OPT1.5	20.00	14.10	
OPT6.0	46.50	21.00	
OPT12.5	63.50	31.70	

Universal joints



world leaders in the art of linear measurement



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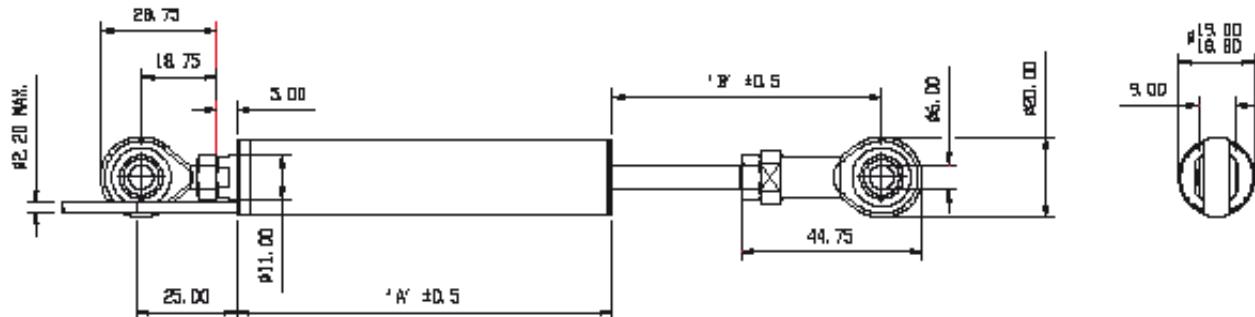
Measuring range (total travel mm)	5	10	15	20	30	50	100	150	200	300		
											SIP 65	SIP 67
Mechanical												
Axial connector	●	●	●	●	●	●	●	●	●	●		
Free Core	●	●	●	●	●	●	●	●	●	●		
Guided core	●	●	●	●	●	●	●	●	●	●		
Screw Mount	●	▲	▲	▲	▲	▲	▲	▲	▲	▲		
High Temp,	●	■	●	●	●	●	●	●	●	●		
Display/Controller	SI 1000	SI 3000	SI 7000									
DRC	●	●	●	●	●	●	●	●	●	●	●	●
OD 2	●	●	●	●	●	●	●	●	●	●	●	●
OD 4	●	●	●	●	●	●	●	●	●	●	●	●
OD 5	●	●	●	●	●	●	●	●	●	●	●	●
BICM (15-0-15V)	●	●	●	●	●	●	●	●	●	●	●	●
BICM (24V)	●	●	●	●	●	●	●	●	●	●	●	●
TTL module	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	●
Orbit	●	●	●	●	●	●	●	●	●	●	●	●

Note! High Temperature is for Transducers only

●	Compatible
▲	Refer to Engineering
■	Not Available

measuring range in mm

Guided with Universal Joints



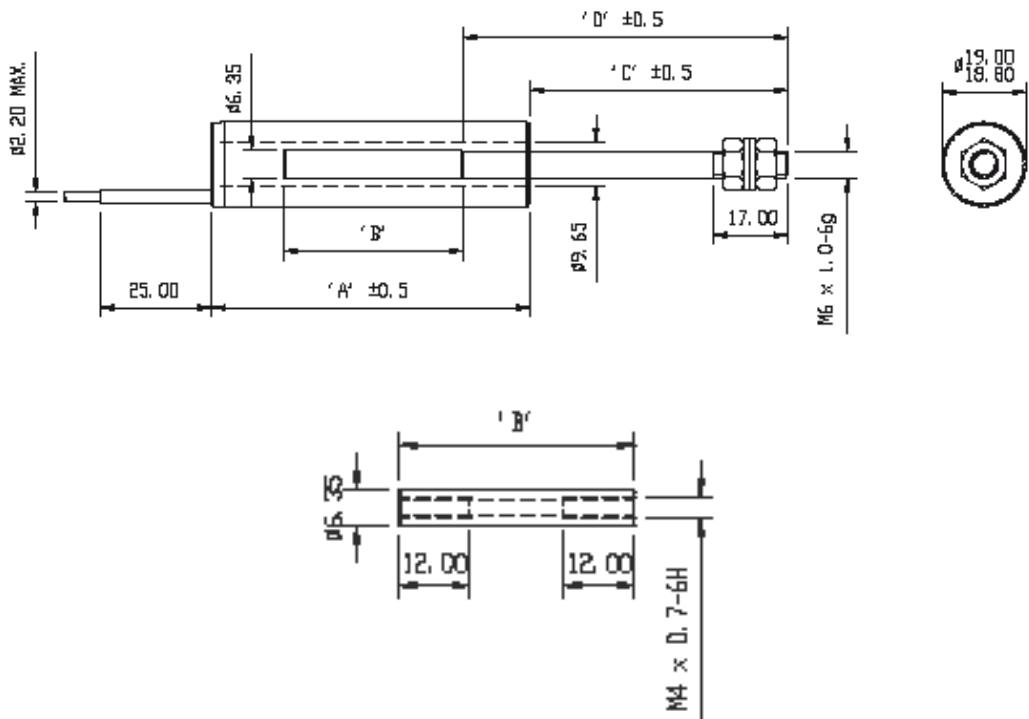
Guided with Universal Joints

A/C	'A' mm Body length	'B1' mm Fully Extended	'B2' mm At null	'B3' mm Retracted
± 2.5 mm	55	53.25	49.5	45.4
± 5 mm	74.5	64.25	57	49.4
± 7.5mm	81.7	68.25	59.9	51.2
± 10 mm	96	79.25	66.8	53.9
± 15 mm	110.4	97.25	76.3	55
± 25 mm	131.9	120.25	89.1	57.5
± 50 mm	189.5	178.25	124	69.4
± 75 mm	239.7	249.25	169.9	90.2
± 100 mm	297.2	309.23	201.18	93.08
± 150 mm	412	475	309.5	141.73

DC/DC & 4-20 mA

5 mm	94	53.25	49.5	45.4
10 mm	113.5	64.25	57	49.4
15 mm	120.7	68.25	59.9	51.2
20 mm	135	79.25	66.8	53.9
30 mm	149.4	97.25	76.3	55
50 mm	170.9	120.25	89.1	57.5
100 mm	228.5	178.25	124	69.4
150mm	278.7	249.25	169.9	90.2
200mm	336.2	309.23	201.18	93.08
300 mm	450.9	475	309.5	141.73

Free Core & Free Core with Carrier



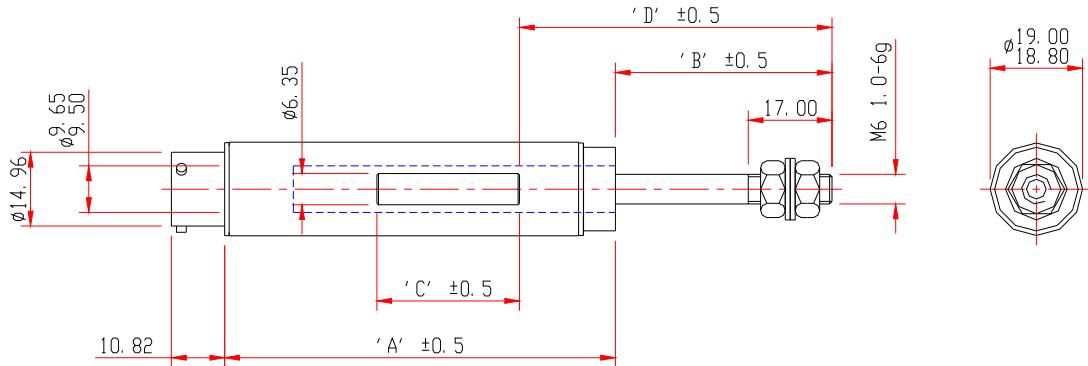
Free Core & Free Core with Carrier

A/C	'A' mm body length	'B' mm core length	'C' mm at null	D' mm
± 2.5 mm	33.5	16.5	40.5	47
± 5 mm	53	29	48	58
± 7.5mm	60.2	34	50.9	62
± 10 mm	74.5	40	57.75	73
± 15 mm	88.9	37.5	67.3	91
± 25 mm	110.4	38.5	80.05	114
± 50 mm	168	50	115	172
± 75 mm	218.2	50	160.9	243
± 100 mm	275.7	50	192.15	303
± 150 mm	390.5	50	300.72	469

DC/DC & 4-20 mA

5 mm	72.5	16.5	40.5	47
10 mm	92	29	48	58
15 mm	99.2	34	50.9	62
20 mm	113.5	40	57.75	73
30 mm	127.9	37.5	67.3	91
50 mm	149.4	38.5	80.05	114
100 mm	207	50	115	172
150mm	257.2	50	160.9	243
200mm	314.7	50	192.15	303
300 mm	429.5	50	300.72	469

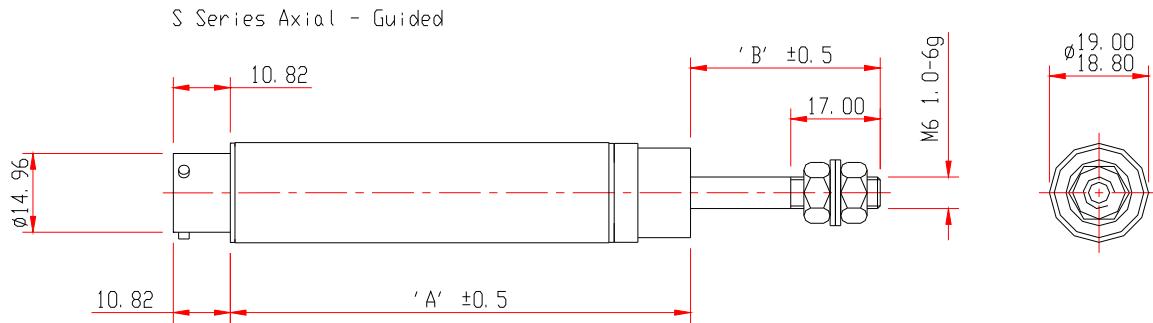
Free Core & Carrier Axial Connector



S Series Axial - Free Core & Carrier

Transducer Type	'A' mm Body Length	'B' mm At Null	'C' mm Core Length	'D' mm
Free Core & Carrier				
AC Version				
± 2.5mm	60.40	39.10	16.50	56.50
± 5mm	79.40	46.50	29.00	67.50
± 7.5mm	86.40	49.40	34.00	71.50
± 10mm	101.40	56.30	40.00	82.50
± 15mm	116.40	65.80	37.50	100.50
± 25mm	137.40	78.60	38.50	123.50
± 50mm	194.40	113.60	50.00	181.50
± 75mm	245.40	159.50	50.00	252.50
± 100mm	301.40	190.70	50.00	312.50
± 150mm	416.40	299.30	50.00	478.50
Free Core & Carrier				
DC/DC and 4-20mA				
5mm	93.40	39.10	16.50	56.50
10mm	110.40	46.50	29.00	67.50
15mm	119.90	49.40	34.00	71.50
20mm	134.40	56.30	40.00	82.50
30mm	148.40	65.80	37.50	100.50
50mm	170.40	78.60	38.50	123.50
100mm	227.40	113.60	50.00	181.50
150mm	278.40	159.50	50.00	252.50
200mm	333.40	190.70	50.00	312.50
300mm	448.30	299.30	50.00	478.50

Guided Core & Carrier Axial Connector



S Series Axial - Guided

Transducer Type	'A' mm Body Length	'B1' mm Extended	'B2' mm At Null	'B' mm Retracted
Guided				
AC and Digital				
± 2.5mm	68. 40	40. 60	32. 60	27. 60
± 5mm	87. 40	51. 00	40. 00	30. 50
± 7. 5mm	94. 40	55. 00	42. 90	32. 40
± 10mm	109. 40	66. 00	49. 80	35. 00
± 15mm	124. 40	84. 00	59. 30	36. 10
± 25mm	145. 40	107. 00	72. 10	38. 60
± 50mm	202. 40	165. 00	107. 10	50. 70
± 75mm	253. 40	236. 00	153. 00	71. 40
± 100mm	309. 40	296. 00	184. 20	73. 90
± 150mm	424. 40	462. 00	292. 80	125. 00
Guided				
DC/DC and 4-20mA				
5mm	101. 40	40. 60	32. 60	23. 00
10mm	118. 40	51. 00	40. 00	29. 00
15mm	127. 90	55. 00	42. 90	30. 80
20mm	142. 40	66. 00	49. 80	33. 50
30mm	156. 40	84. 00	59. 30	34. 60
50mm	178. 40	107. 00	72. 10	37. 60
100mm	235. 40	165. 00	107. 10	49. 10
150mm	286. 40	236. 00	153. 00	69. 90
200mm	341. 40	296. 00	184. 20	72. 40
300mm	456. 30	462. 00	292. 80	123. 50

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

SM/MD/DF series

Miniature displacement sensors

SM



- Rugged construction
- Short body length
- Good performance

SM sensors cover two standard types in two measurement ranges $\pm 1\text{mm}$ and $\pm 3\text{mm}$. They are designed for measuring displacement in applications where infinite resolution and precise repeatability is required in a very small size.

The coils are wound on a PPS (40% GL) former and housed in a stainless steel case. The epoxy bonded construction makes the device suitable for operation in wet and oily environments and in applications with high levels of mechanical stress.

The core carrier assembly moves friction free within the sensor, an alternative option where the core is provided threaded at both ends is available allowing the user to manufacture their own carrier interface. Recommended carrier material is titanium.

MD

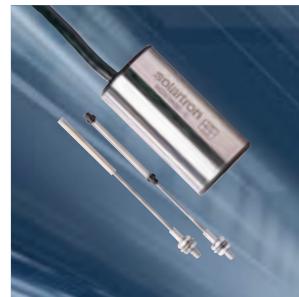


- Small diameter
- Right angle cable outlet option
- Low core weight
- Screened cable

The small case diameter (6mm and 8mm) allows for easy installation in confined spaces. A right angle output facility is available as a retrofit for the 8mm version.

The low core weight makes this range ideal for use in low inertia systems. Cross talk is prevented by the screened cable, which also allows for multiple use of these sensors in close proximity.

DF



- Measurement range to 10mm
- High Output
- Excellent repeatability
- Low power

The DF dc miniature displacement sensor has a friction-free core and the DFg has a free guided core incorporating Delrin bearings. All types incorporate a linear variable differential transformer (LVDT) as the measuring source together with oscillator, demodulator and filter providing a self-contained unit accepting a DC input and providing a DC output relative to armature position.

With high linearity and low mass of moving parts, these are ideally suited to applications in civil, mechanical, chemical and production engineering. Also, when mounted in a suitable load-sensitive member such as a proof ring or diaphragm, they can provide load or pressure measurement.

Sensor

LVDT with Free Core	SM1	SM3	M6D1	MD1	MD2.5	MD5	MD10	-
Half Bridge (HB) with Free Core	-		M6DH1	MD1H	MD2.5H	MD5H	MD10H	-
DC Output with Free Core				-				DF1 DF2.5 DF5
DC Output with Guided Core				-				DFg1 DFg2.5 DFg5

Measurement

Measurement Range (mm)	± 1	± 3	± 1	± 1	± 2.5	± 5	± 10	± 1	± 2.5	± 5
Linearity (% FSO)	0.25				-				0.30	
Linearity (% Reading)	-				0.5				-	
Resolution μm^1				<0.1			<0.2			see Note 1
Temperature Coefficients (%FSO/ $^{\circ}\text{C}$)	<0.03%			<0.01%				<0.025%		

Mechanical

Body diameter (mm)	9.52	6h6	8h6	19.0						
Case Material	400 Stainless Steel									
Cable Type	PU									
Standard cable Length (m)	0.5	2		3						
Standard cable Style	A	B								
Nominal Mass (g)	6.0	8.0	2.6	5.0	7.6	8.5	13.0	26.0	26.0	30.0
Nominal Mass of Moving Parts (g)	0.50	1.50	0.10	0.20	0.30	0.70	1.00	1.00	1.00	1.20

Environment

Operating Temperature ($^{\circ}\text{C}$)	-40 to +85	-10 to +80	-5 to +70
Storage Temperature ($^{\circ}\text{C}$)	-40 to +100	-40 to +105	-10 to +80
Sealing	Splash Proof		

Electrical Interface

Energising Voltage	1-10 (Vrms)						17-24 (VDC)	
	3.8	1.8	3.0	1.8	2.0	1.0	0.6	-
Energising (LVDT) Current at 5kHz (mA/V)	-		1.2	1.0	-	1.2	-	-
Energising Current (HB) at 10kHz (mA/V)								
Energising Current (DC) at 10V (mA)					-		10	13
frequency Response (-3db) Hz					Depends on Conditioning Electronics		50	75
Sensitivity at 10VDC $\pm 10\%$ mV/mm					-		75	54
Sensitivity at 5kHz $\pm 10\%$ mV/mm	142	136	269	210	150	105	33	-
Sensitivity (HB) at 10kHz $\pm 10\%$ mV/mm	-		88	83	82	51	33	-

Note 1: Resolution specification is only applicable to ORBIT digital sensors.
The resolution of LVDT sensors is effectively infinite and is only limited by the conditioning electronics.

Cable Style A comprises of individual twisted cores

Cable Style B comprises a sheathed and screened cable

Also see...

Dimensions and drawings

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