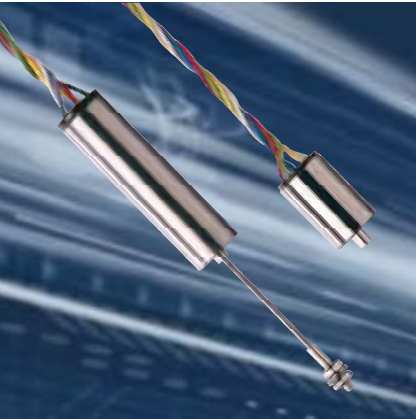


SM/MD/DF series

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

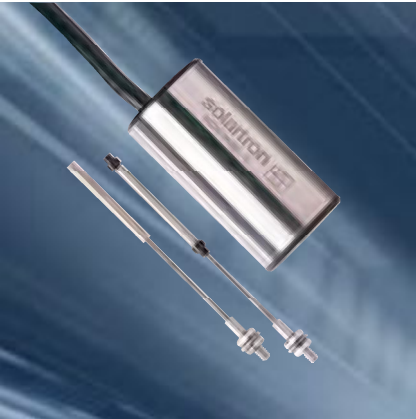


- ▶ Small diameter
- ▶ Right angle cable outlet option
- ▶ Low core weight
- ▶ Screened cable

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/°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	1.20
Environment										
Operating Temperature (°C)	-40 to +85		-10 to + 80					-5 to +70		
Storage Temperature (°C)	-40 to +100		-40 to +105					-10 to + 80		
Sealing	Splash Proof									
Electrical Interface										
Energising Voltage	1-10 (Vrms)							17-24 (VDC)		
Energising (LVDT) Current at 5kHz (mA/V)	3.8	1.8	3.0	1.8	2.0	1.0	0.6	-		
Energising Current (HB) at 10kHz (mA/V)	-		1.2	1.0	-	1.2	-	-		
Energising Current (DC) at 10V (mA)	-							10	13	
frequency Response (-3db) Hz	Depends on Conditioning Electronics							50	75	
Sensitivity at 10VDC ±10% mV/V/mm	-							75	54	
Sensitivity at 5kHz ±10% mV/V/mm	142	136	269	210	150	105	33	-		
Sensitivity (HB) at 10kHz ±10% mV/V/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



The complete Orbit3 product range is vast. For full information refer to Solartron's Orbit3 catalogue or our website.

Controllers

- ▶ USB, RS232 and ethernet interfaces



Controllers

Controllers	USB Interface Module (USBIM)	RS232 Interface Module (RS232IM)	Ethernet Interface Module (ETHIM))
Computer Interface			
Bus	USB 2.0 full speed	RS232 (up to 115.2 kB)	Ethernet
Operating system	Microsoft Windows		
Network Interface			
Number of Orbit modules (with/without PSIM)	150/4	150/0	
Baud rate	187.5 kB, 1.5 MB, 2.25 MB	187.5 kB, 1.5 MB	
Measurement Modes	Standard and Dynamic	Standard	
Typical reading rates (rdgs/sec)	Up to 3906	250	460
Power and Environment			
Current at 4.75 V to 5.25 V DC (mA)	250	62	
Operating Temperature (°C)	0 to +60		

The Orbit3 Digital Network system for single or multiple channels is the solution to get fast and reliable data from displacement sensors and, for example, third party pressure, temperature and rotary sensors, quickly and easily into a computer or PLC.

Orbit software

Solartron provide an Orbit library fully compatibility with Windows 7 and all 64 bit Windows operating systems. OrbMeasureLite is an out of the box application for small networks which includes seamless interfacing to Excel.

Orbit measurement modes

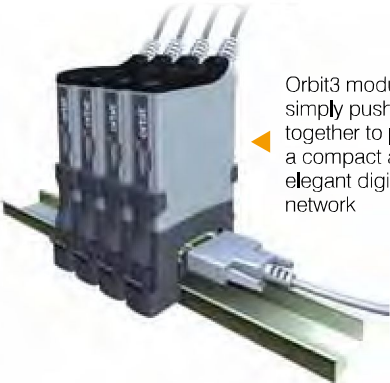
Orbit supports a number of different measurement modes for different applications. In Standard mode each module is read as required whereas Dynamic mode provides a means of rapidly reading synchronised modules up to 3096 readings per second.

Network components

Attached to the end of each sensor is a hot swappable PIE (Probe Interface Electronics) which clips into a T-CON network connector fitted with a detachable 35 mm DIN rail mount.

The completed module simply pushes together with other modules to form an integrated scaleable network.

A power supply interface module (PSIM), controller modules and interface modules complete the package (see over for details).



Orbit3 modules simply push together to provide a compact and elegant digital network

Indicator lamps show power within limits and data transmission active



PIE Strong light weight body with screening against electrical interference to EN61000-6-2

T-CON Strong lightweight construction holding the sensor address to enable HOT SWAP facility. Improved clamping and IP65 option



DIN Rail mount as standard. Removeable to enable alternative mounting options

Modules

- ▶ AIM: for third party sensors
- ▶ SGM: for strain gauges and load cells
- ▶ EIM: for linear encoders and line scales
- ▶ DIOM: for control of inputs and outputs



Modules

Modules	Analogue Input Module (AIM)	Encoder Input Module (EIM))	Strain Gauge Module (SGM)	Digital input-output Module (DIOM)
Inputs/Outputs				
Input Type	Voltage or Current	Incremental Encoder (TTL)	Strain Gauge	8 channel Input/Output
Input Voltage (VDC)	0-24, 0-10, 0-5, ±10, ±5	max. 30	-	0 to 30
Input Current (mA)	4-20, 0-20, ±20	< 10	-	1 per Channel
Voltage Output	-		5V AC	Up to 8, open drain up to 30 V @ 50 mA
Network Interface				
Measurement Modes	Standard/Dynamic			
Linearity (%FSO)	0.05	-	0.02	-
Bandwidth (Hz)	460			-
Power and Environment				
Current at 4.75 V to 5.25 V DC (mA)	Up to 154 depending on type	49		42
Operating Temperature (°C)	0 to +60			

orbit3 digital probes

Solartron Metrology is the world's largest manufacturer of 'pencil' style electronic gauging probes.

Featured here are standard spring push sensors from our Orbit digital range.

Other methods of actuation include pneumatic and vacuum retract with LVDT, half bridge and Orbit variants.

Specialist gauging sensors are also available - visit our web site for details.



Standard spring actuated probes						
Axial Cable Outlet	DP/2/S	DP/5/S	DP/10/S	DP/12/S	DP/20/S	DP10/2/S
Radial Cable Outlet	DPR/2/S	-	DPR/10/S	-	DPR/20/S	-
Body Diameter	8h6					
Measurement Range (mm)	2	5	10	12	20	2
Pre-Travel (mm)	0.15					
Over Travel (mm)	0.85					8.85
Accuracy (% reading)	0.05		0.06	-	0.07	0.05
Repeatability (µm)	< 0.15					
Tip Force (N) at centre travel ±20%	0.7					
Resolution (µm) - user selectable	< 0.01	< 0.05		-	< 0.01	
Data Speed - user selectable	Up to 3906 readings per second					
Case Material	Stainless steel					
Gaiter	High grade polymer					
Operating Temperature (°C)	-5 to +80					
Sealing	IP65					

ATM analogue to TTL module

- Compatible with all Solartron sensors
- Will not overspeed even at high resolution settings
- Absolute position constantly accessible
- Range of resolution and frequency options
- Status Indication lamps

An alternative interface method to Orbit, the ATM provides a solution to simple PLC interfacing for Solartron sensors.



ATM TTL converter	
Measurement	
Sensor types	Solartron Gauging and Displacement Sensors 0.5 mm to 150 mm depending on sensor
Accuracy (%FSO)	Up to 0.15% reading depending on sensor
Resolution (x4 interpolation)	0.1 µm
Repeatability	<0.15 µm depending on sensor
Electrical	
Power	+5 ±0.25 VDC @ 100 mA
Output Signal	A and B, /A and /B TTL square waves RS422 levels
Output frequency (kHz)	50, 100, 125, 250, 360 & 500 (factory selectable)
Bandwidth	100 Hz
Environmental (electronics)	
Sealing	IP43 for ATM Module
EMC	Emmissions: EN61000-6-3 Susceptibility: EN6100-6-2
Operating temperature (°C)	0 to +60
Storage temperature (°C)	-20 to +70

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

orbit3 LE linear encoders

- Orbit compatible
- 12 and 25 mm measuring range
- Spring, free, pneumatic and cable operation
- <0.4µm accuracy
- <0.02 resolution
- TTL output

The Linear Encoder range of measuring sensors uses a highly stable and accurate optical sensor in conjunction with precisely manufactured bearings for use in applications requiring consistent sub micron measurement accuracy.



Linear encoder	LE12		LE25	
Output	Orbit	TTL	Orbit	TTL
Measurement				
Measurement range (mm)	12		25	
Mechanical travel (mm)	13		26	
Accuracy (μm)	±0.4	±0.5	±0.4	±0.5
Repeatability (μm)	0.1			
Resolution (μm)	0.5	depends on electronics	0.5	depends on electronics
Reference mark position (mm)	3 approximately from end stop			
Maximum gauging speed (m/s)	0.5	See table below	0.5	See table below
Tip Force (N) Up/Down/Horizontal	0.1/0.6/0.5			
Temperature coefficient (μm/°C)	-0.35 to -0.5		-0.4 to -0.7	
Mechanical				
Scale material	Quartz			
Shaft material	Stainless Steel			
Gaiter material	Viton			
Environment				
Operating Temperature (°C)	+ 10 to + 50			
Storage Temperature (°C)	-20 to + 70			
IP rating	Option 50/65 for spring actuation, 65 for pneumatic			
Electrical Interface (Orbit)				
Bandwidth	Up to 460 Hz (selectable)			
Output	Solartron Orbit			
Power (VDC)	5±0.25 @ 0.06A			
Sealing	IP43			
Weight (grams)	Probe Interface electronics		52	
T connector (including DIN rail adaptor)			46	

TTL output gauging speeds			
Probe signal period (µm)	Interpolation	Quad edge period (µm)	Maximum gauging speed (m/s)
0.4	X25	0.1	0.5
0.2	X50	0.05	0.5
0.1	X100	0.025	0.4
0.05	X200	0.0125	0.2

Also see...	
Sensor dimensions/drawings	Page 39 ►
Orbit interface dimensions/drawings	Page 41 ►

SI 1000 series

Panel mount display / controllers



- ▶ Red 7 digit display
- ▶ RS232 or RS485 Serial outputs
- ▶ VDC or 4-20 mA outputs
- ▶ Low, OK, High lamps and relays
- ▶ Peak Hold

The Si 1000 series is a simple to use, cost effective single channel solution to a wide range of laboratory and industrial linear position monitoring and control applications.

The versatile SI 1100 provides up to 0.1µ resolution when used with Solartron's LVDT Displacement and Gauging sensors. A choice of VDC, 4-20 mA outputs and relays make it easy to communicate with PLC's. RS232 and RS485 serial ports are also standard.

Where long cable runs are required, the SI 1300 is an obvious choice. Two wire loop powered 4-20 mA connection to Solartron's S and SR Series of rugged Displacement Sensors completes a simple to install system with impressive performance. DC/DC operation is also standard for use with DC versions of the S and SR series.

The SI 1500 is a cost effective yet versatile panel mount display for use with Orbit® based Digital Probes, Linear Encoders and Modules.

Dimensions	
Case size (incl. bezel)	H = 48mm x W = 96 x D = 137mm
Panel cut out	H = 44,5mm x W 93mm
Depth behind panel (inc. terminals)	135mm
Display	
Display Type	7 digit red led
Display Update Rate	Up to 10 readings/second
Indicators	Low, OK and High warning lamps
Range	99.9999 to +99.9999
Resolution	1mm to 0.1µm (user selectable)
Bandwidth/response time/sensor reading rate	Up to 100 readings/second
Discrete Inputs	Zero, Peak(+Peak/-Peak/Difference), Hold
Outputs	
Analogue	4-20 mA, -5V to +5V, -10V to +10V, 0V to +5V, 0V to +10V (selectable)
Discrete	Alarm Relay - Open Collector Low, OK and High Relay Response Time = 0.1-9.9 seconds (selectable)
Communications	
Serial Port	RS232 or RS485 Configurable
Power	
Voltage	+24 VDC
Current	850 mA Max
Environmental	
Operating Temperature	10°C to 40°C
Storage Temperature	-10°C to 70°C
Electrical Immunity	EN6100-6-2:2007
Electrical Emissions	EN61000-6-3:
Front Panel Sealing	IP65

SI 3000 series

Twin axis display / controllers



- ▶ Intuitive menu
- ▶ 2 channel 7 digit colour displays
- ▶ 2 channel analogue colour displays
- ▶ Auto colour change for in/out range
- ▶ Auto course/fin e resolution
- ▶ Peak hold facility
- ▶ Data logging facility
- ▶ RS232 output
- ▶ Discrete I/O
- ▶ 4-20mA or DC output

Specifically designed for use with Solartron's high performance Orbit® network, the SI 3500 features an intuitive, menu driven-twin axis display which can be programmed to display readings, set Limits/Alarms, Peak Hold, Track, or act as a Data Logger for inputs from one or two sensors.

LCD Display	
Digital	2 x colour
Analogue	2 x colour horizontal bars
Update speed	40Hz
Display length (mm)	± xx.xxxxx (user selectable)
Display length (ins)	± x.xxxxx (user selectable)
Resolution mm	Down to 0.05µm (user selectable)
Resolution ins	Down to 0.000005" (user selectable)
Keypad	
Membrane type with 9 keys	Print, Zero, Up, Down, Left, Right, Enter, Peak Hold/Track, Menu
Measurement type	A, B, A+B, A-B, (A+B/2), (A-B/2), (B-A/a) X und Y
Data Logging	A, B, A+B, A-B, (A+B/2), (A-B/2), (B-A/a) X and Y 10,000 readings via switch or 1ms to 24hr time interval
Indications	mm/inch, Lower & Upper Limits, Out of Range, Measurement Mode
Power requirement	+24 VDC ± 10%
External I/O	
Serial	RS232 serial port (for printer or PC)
Discrete Output	2 x 3 isolated
Analogue Output	2 channels DC or 4-20mA
Environmental	
Front Panel	IP65
Case	IP51
Rear connection	IP51
EMC	Immunity: EN6100-6-2:2001 Emissions: EN61000-6-3:20011
Storage Temperature (°C)	-20 to +50
Operating Temperature (°C)	0 to +50
Mechanical	
Mounting	Bench top or panel mount
Dimensions WxHxD (mm)	Without bezel 134 x 65x160 With bezel 144 x 74 x 175

Signal conditioning modules

OD series

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

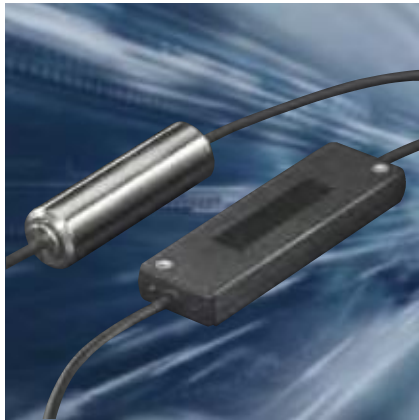
The **OD2** is a two wire 4-20mA signal conditioner. It is designed for long distance signal transmission due to low noise susceptibility. A cable break results in no current flow indicating a fault.

The **OD4** (**OD5** is a mains powered equivalent) is a signal conditioning unit powered from a single 10-30VDC 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 10m from the sensor. An IP67 variant of the BICM is also available.



ATM TTL converter

TTL RS 232 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.

Module	OD2	OD4	OD5	DRC	BICM	
Power Requirement						
Input Voltage	13-42 VDC	10-30VDC	90-264VAC	10-30VDC	±15VDC	24VDC
Input Current (mA)	<30	140-50	250-100	160-70	±12	24
Frequency (Hz)	-		47-63	-		
Sensor Excitation						
Primary voltage (Vrms)	0-9	3			1.2 - 21	
Primary frequency (kHz)	5 or 13	2.5 or 5	-	5,10 or 13	5	
Signal Input						
Input Range	30-530mV/V ¹	55 to 5000mV LVDT full range			up to 3.5	
Input Load (kΩ)	2	2, 10, 100		2, 100	100	
Options	-	Forward and reverse polarity, half bridge		see note 2	-	
Signal Output						
Voltage Output	-	Up to ±10				
Current Output	4-20	Up to ±20 into 150Ω load				
Output Ripple	<38μA rms	<1 mV rms	-		<14	
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			250	
Environmental						
Storage Temperature	-40 to +80	-20 to +80			-	
Operating Temperature	0 to +60				-	
IP rating	65	40		None	IP40/67	IP40
Mechanical						
Sensor connections	Terminals	DIN connector	-	Terminals	Solder tag or factory fit for IP67	
Power connections	Terminals	-	IEC320 C14	-	-	
Weight						
Material	ABS	Painted Aluminium Box		Plastic	Plastic or Stainless Steel IP67	
Mounting	Holes	-		DIN rail	-	

Note 1: For sensors with sensitivity > 250mV/V, an adjustable attenuator is required- contact sales
Note 2: Sensor is connected via external screw terminal user can therefore configure options
Note 3: For higher environmental levels (and other custom options) contact sales office

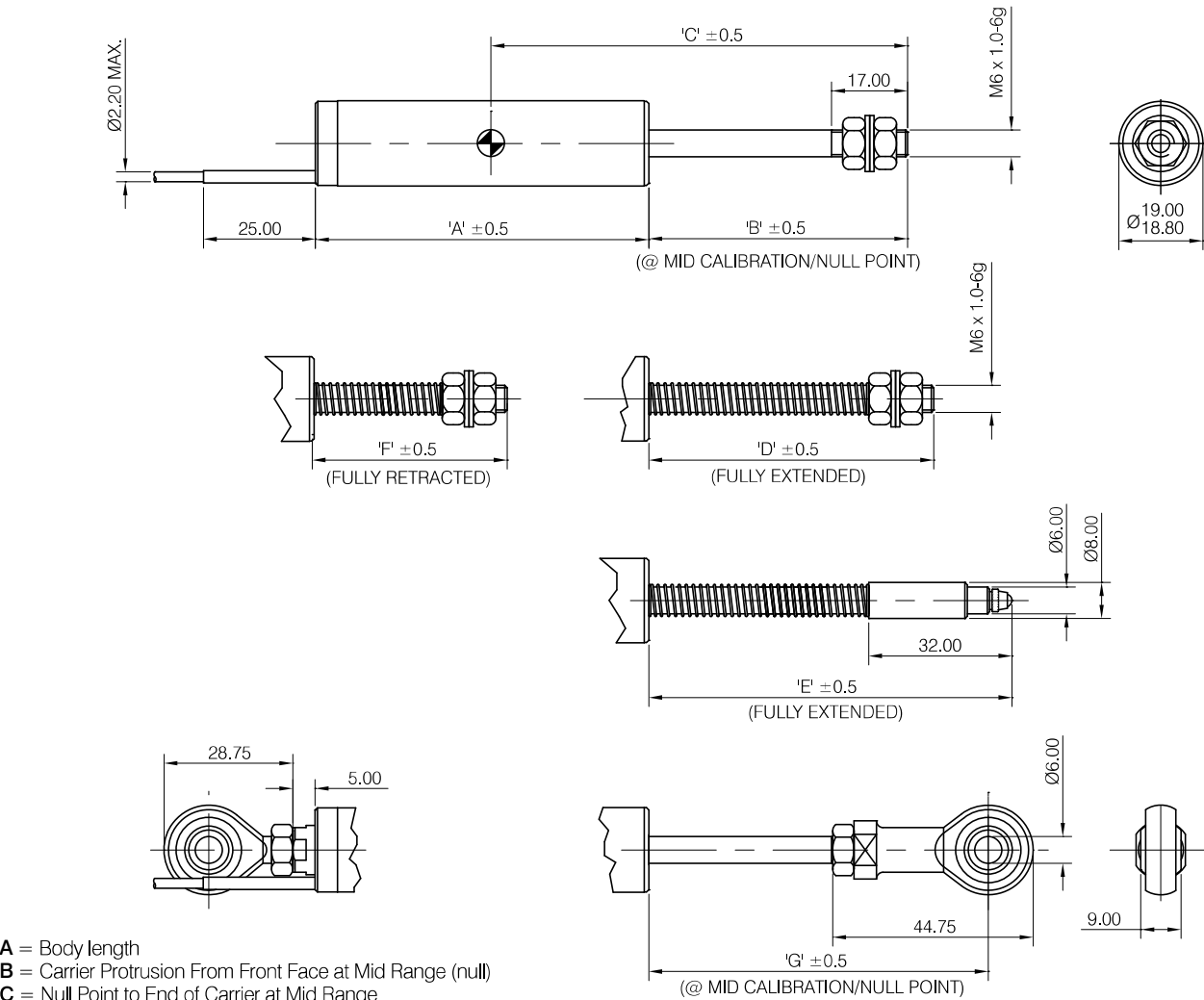
Module	ATM TTL converter
Measurement	
Sensor types	All Solartron Displacement Sensors
Accuracy (%FSO)	<0.25
Resolution (x4 interpolation)	0.1
Repeatability	sensor dependent
Electrical	
Power	+5 ±0.25 VDC @ 100 mA
Output Signal	A and B, /A and /B TTL square waves RS422 levels
Output frequency (kHz)	50, 100, 125, 250, & 500 (factory selectable)
Bandwidth	100 Hz
Environmental (electronics)	
Sealing	IP43
Operating temperature (°C)	0 to +60
Storage temperature (°C)	-20 to +70

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

Also see...	
Dimensions and drawings	Page 40

S series
Dimensions (mm)

Guided Core, Spring Push and Universal Joints

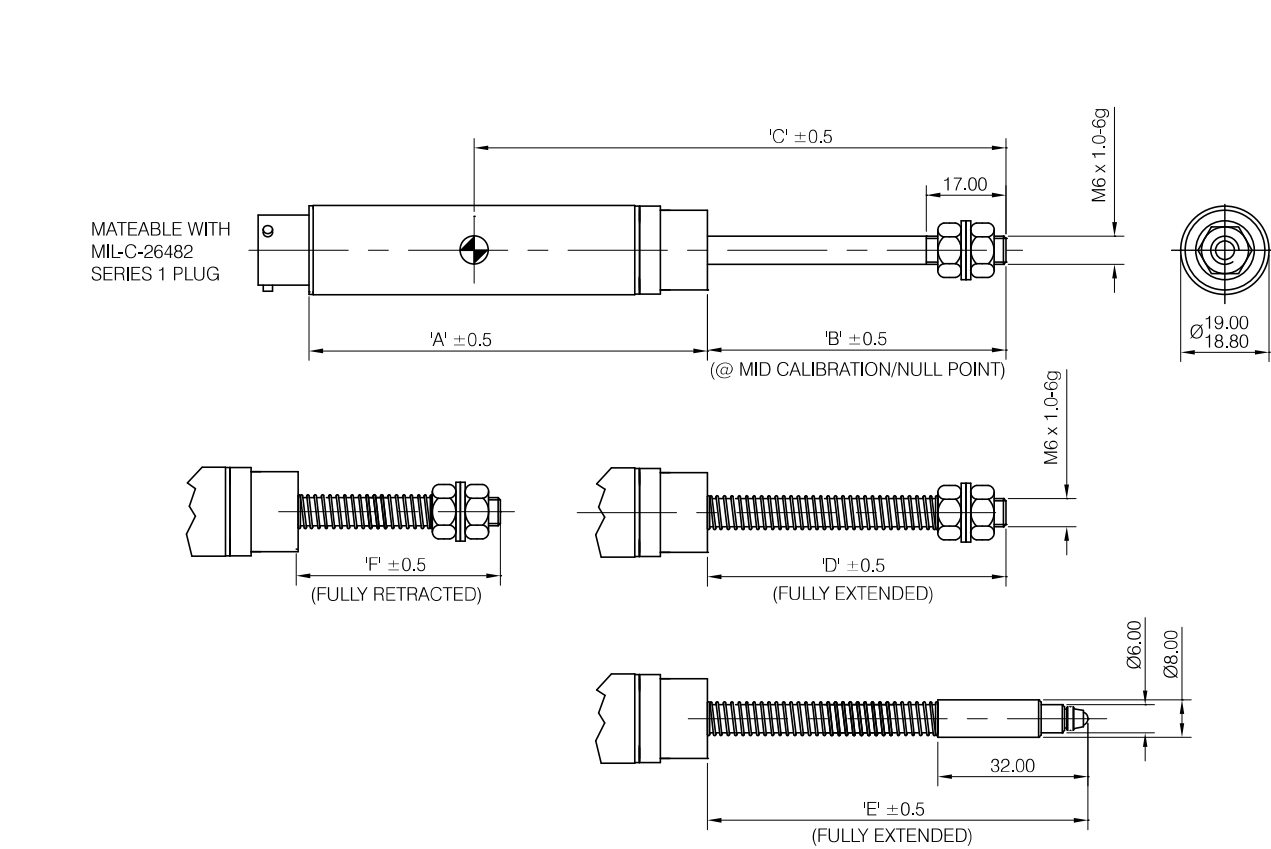


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Carrier Protrusion From Front Face at Fully Out with Spring Fitted
E = Carrier Protrusion From Front Face at Fully Out with Tip Fitted
F = Carrier Protrusion From Front Face Fully Retracted
G = Distance from centre of UJ to front face at Mid Range
CF = Consult Solartron for this option

Range (mm)		Guided Core, Spring Push and Universal Joints							
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All					
		A	A	B	C	D	E	F	G
±2.5	5	55.1	94.0	31.2	56.8	35.7	50.8	24.4	49.5
±5	10	74.6	113.5	38.7	74.0	46.7	61.8	28.4	57.0
±7.5	15	81.8	120.7	41.6	80.5	50.7	65.8	30.2	59.9
±10	20	96.1	135.1	48.4	94.5	61.7	76.8	32.8	66.8
±15	30	110.5	149.4	58.0	111.3	79.7	94.8	34.0	76.3
±25	50	132.0	171.0	70.7	134.8	102.7	117.8	36.4	89.1
±50	100	189.5	228.5	105.7	198.5	160.7	175.8	48.5	124.0
±75	150	239.7	278.7	151.6	269.5	231.7	246.8	69.2	169.9
±100	200	297.2	336.2	182.9	329.5	291.7	CF	71.8	201.2
±150	300	412.1	449.9	291.5	495.5	458.7	CF	122.9	309.5

S series
Dimensions (mm)

Axial Connector / Guided Core

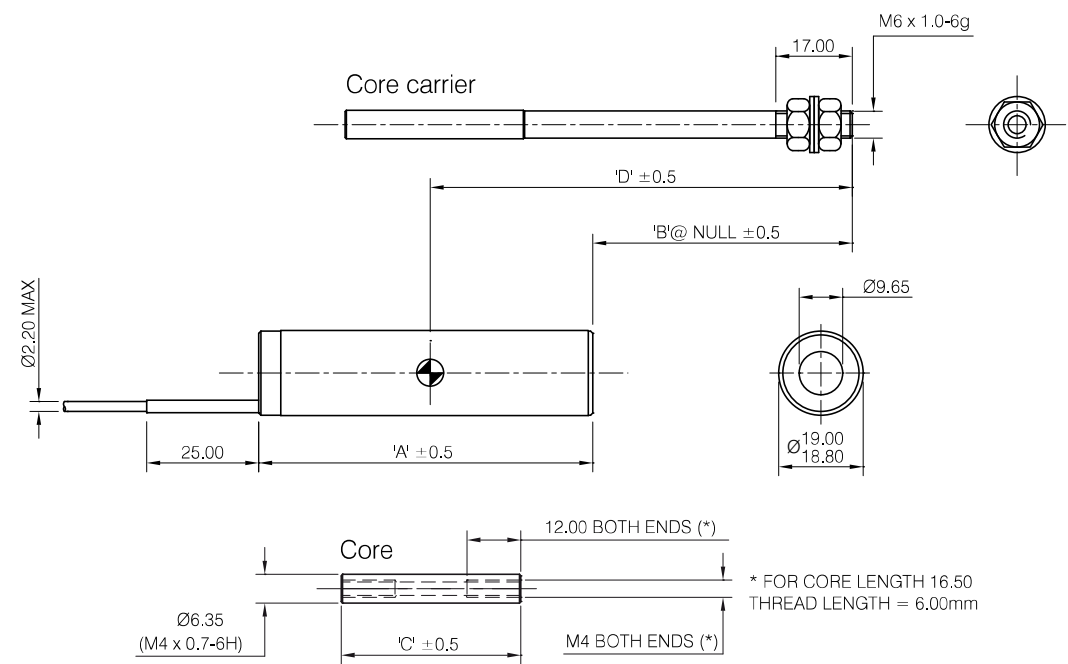


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Carrier Protrusion From Front Face Fully Extended
E = Carrier Protrusion From Front Face Fully Extended + Tip Fitted
F = Carrier Protrusion From Front Face Fully Retracted
CF = Consult Solartron for this option

Range (mm)		Axial Connector Guided Core						
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All				
		A	A	B	C	D	E	F
±2.5	5	68.4	101.4	32.6	64.8	40.0	55.1	27.6
±5	10	87.4	118.4	40.0	82.0	51.0	66.1	30.5
±7.5	15	94.4	127.9	42.9	88.5	55.0	70.1	32.4
±10	20	109.4	142.4	49.8	102.5	66.0	81.1	35.0
±15	30	124.4	156.4	59.3	119.3	84.0	99.1	36.1
±25	50	145.4	178.4	72.1	142.8	107.0	122.1	38.6
±50	100	202.4	235.4	107.1	206.5	164.9	180.1	50.7
±75	150	253.4	286.4	153.0	227.5	236.0	251.1	71.4
±100	200	309.4	341.4	184.2	337.5	296.0	CF	73.9
±150	300	424.4	456.3	292.8	503.5	462.0	CF	125.0

S series dimensions (mm)

Free Core and Free Core with Carrier

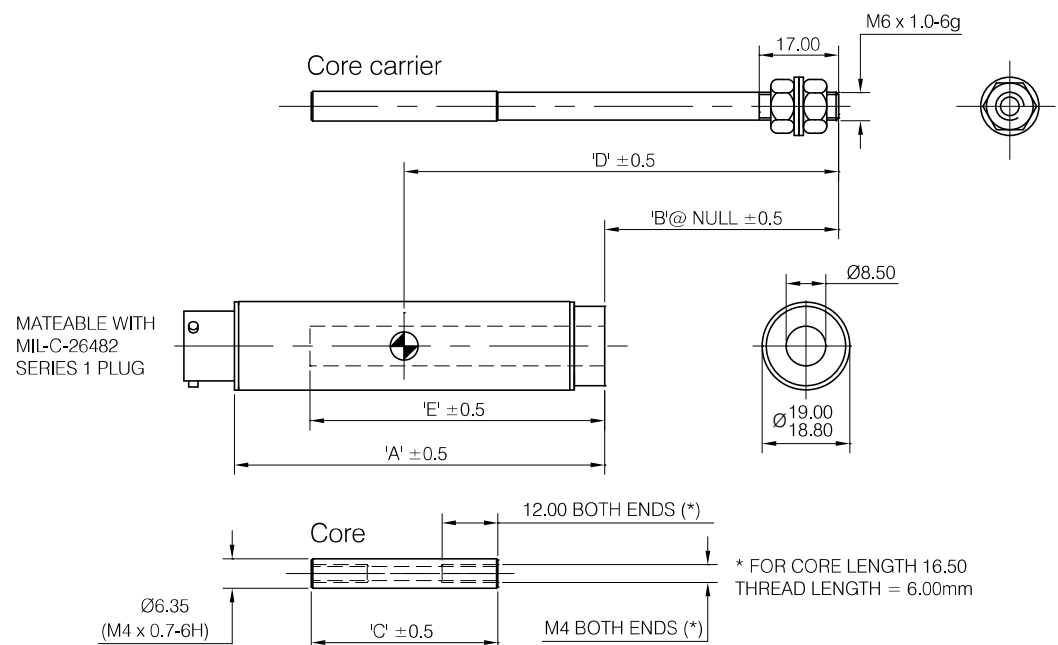


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range

Range (mm)		Free Core and Free Core with Carrier				
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All		
		A	A	B	C	D
±2.5	5	33.4	72.4	40.5	16.5	55.3
±5	10	53.0	91.4	48.0	29.0	72.5
±7.5	15	60.1	99.1	50.9	34.0	79.0
±10	20	74.5	113.4	57.8	40.0	93.0
±15	30	88.9	127.8	67.3	37.5	109.8
±25	50	110.4	149.3	80.1	38.5	103.3
±50	100	167.9	206.8	115.0	50.0	197.0
±75	150	218.1	257.1	160.9	50.0	268.0
±100	200	275.6	314.7	192.2	50.0	328.0
±150	300	390.4	429.5	300.8	50.0	294.0

S series dimensions (mm)

Axial Connector / Free Core and Free Core with Carrier

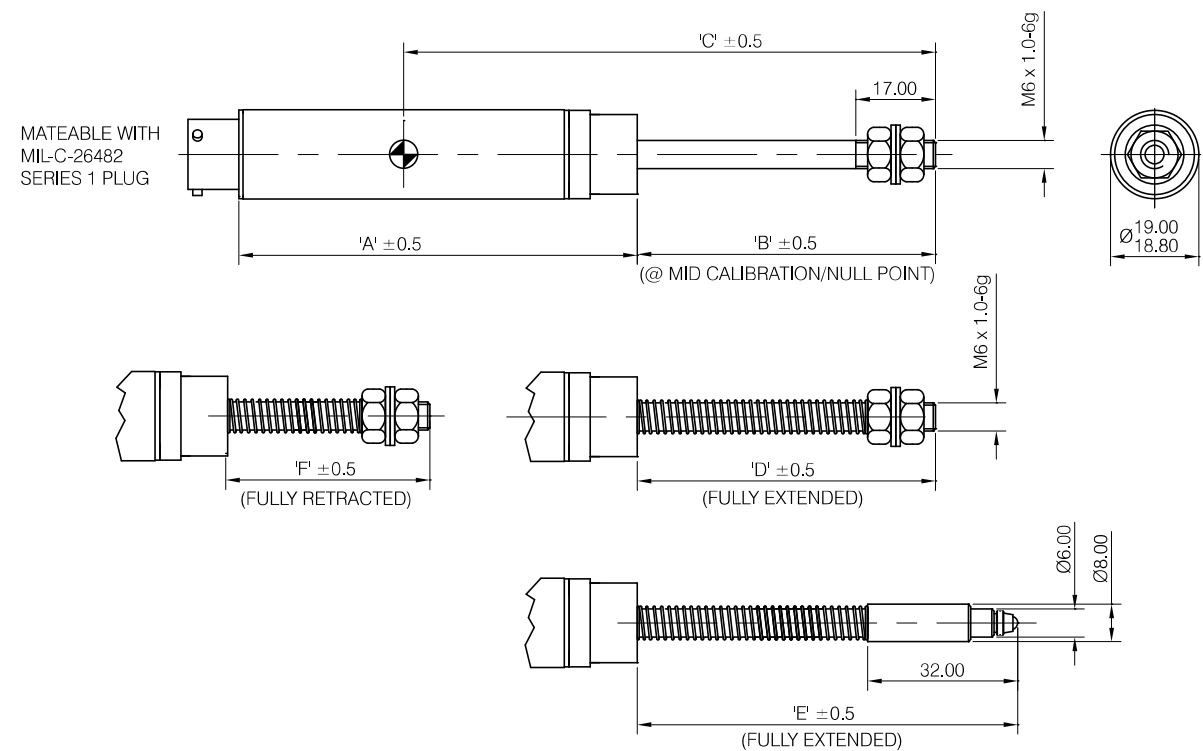


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Bore Depth (minimum)

Range (mm)		Axial Connector Free Core and Free Core with Carrier					
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All			
		A	A	B	C	D	E
±2.5	5	60.4	93.4	39.0	16.5	63.3	41.4
±5	10	79.4	110.4	47.0	29.0	80.5	62.0
±7.5	15	86.4	119.9	49.0	34.0	57.0	69.1
±10	20	101.4	134.4	56.0	40.0	101.0	83.5
±15	30	116.4	148.4	66.0	37.5	117.3	97.9
±25	50	137.4	170.4	79.0	38.5	141.3	119.4
±50	100	194.4	227.4	114.0	50.0	205.0	176.8
±75	150	245.4	278.4	159.0	50.0	276.0	229.4
±100	200	301.4	333.4	191.0	50.0	336.0	284.6
±150	300	416.4	448.3	299.0	50.0	502.0	399.4

SR series dimensions (mm)

Axial Connector / Guided Core

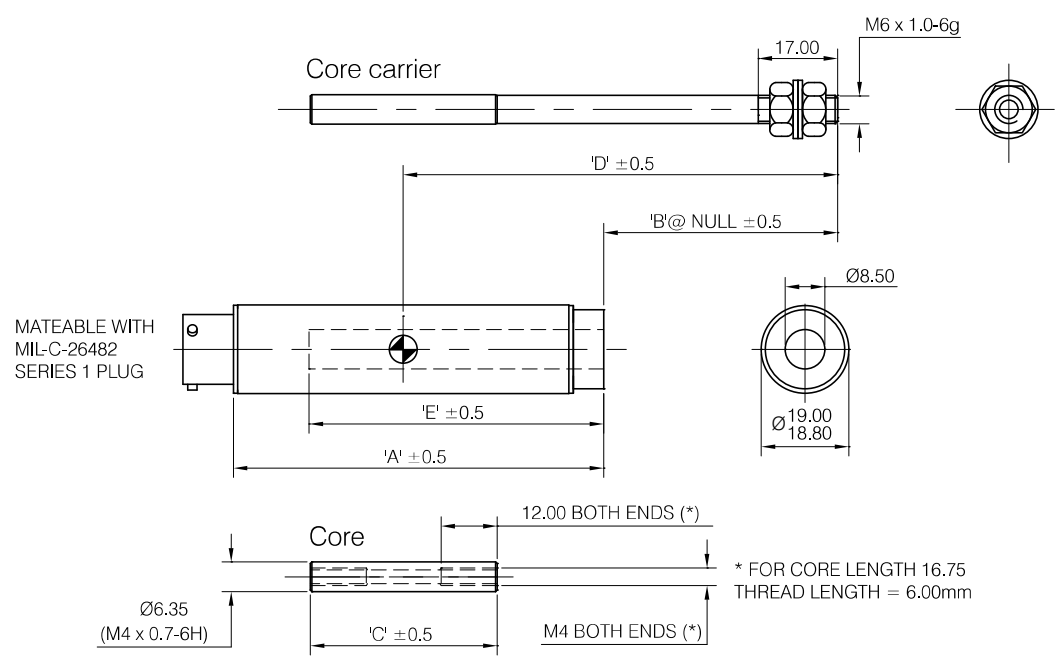


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Fully Extended + Tip Attached
F = Fully Retracted

Range (mm)		Axial Connector Guided Core						
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All				
		A	A	B	C	D	E	F
±2.5	5	68.4	101.4	31.8	65.0	35.8	50.9	28.1
±5	10	87.4	118.4	39.1	83.1	46.8	61.9	32.4
±7.5	15	94.4	127.9	40.8	88.4	50.8	65.9	31.9
±10	20	109.4	142.4	48.4	103.1	61.8	76.9	36.4
±15	30	120.4	156.4	58.4	120.4	79.8	94.9	38.9
±25	50	145.4	178.4	71.2	143.9	102.8	117.9	40.9
±50	100	202.4	235.4	106.2	207.6	160.8	175.9	52.4
±75	150	253.4	286.4	152.1	278.6	231.8	246.9	73.4

SR series dimensions (mm)

Axial Connector / Free Core

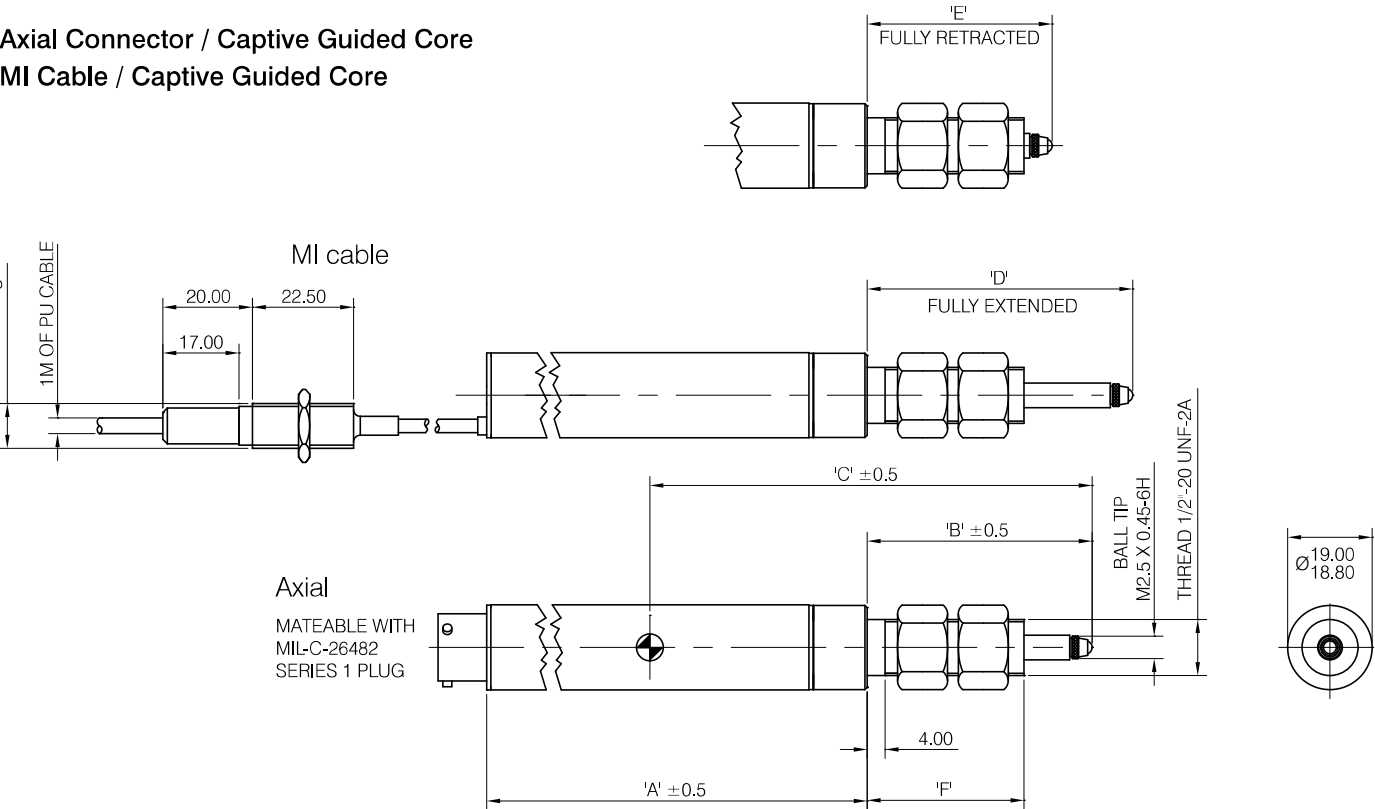


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Bore Depth

Range (mm)		Axial Connector Free Core					
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All			
		A	A	B	C	D	E
±2.5	5	60.4	93.4	37.2	16.75	63.4	44.2
±5	10	79.4	110.4	44.5	29.00	80.5	63.2
±7.5	15	86.4	119.9	46.2	31.50	85.8	70.2
±10	20	101.4	134.4	53.8	39.00	100.5	84.2
±15	30	112.4	148.4	63.8	37.50	117.8	98.2
±25	50	137.4	170.4	76.6	38.50	141.3	120.2
±50	100	194.4	227.4	111.6	50.00	205.0	178.2
±75	150	245.4	278.4	157.5	50.00	276.0	228.2

SR series dimensions (mm)

Axial Connector / Captive Guided Core
MI Cable / Captive Guided Core



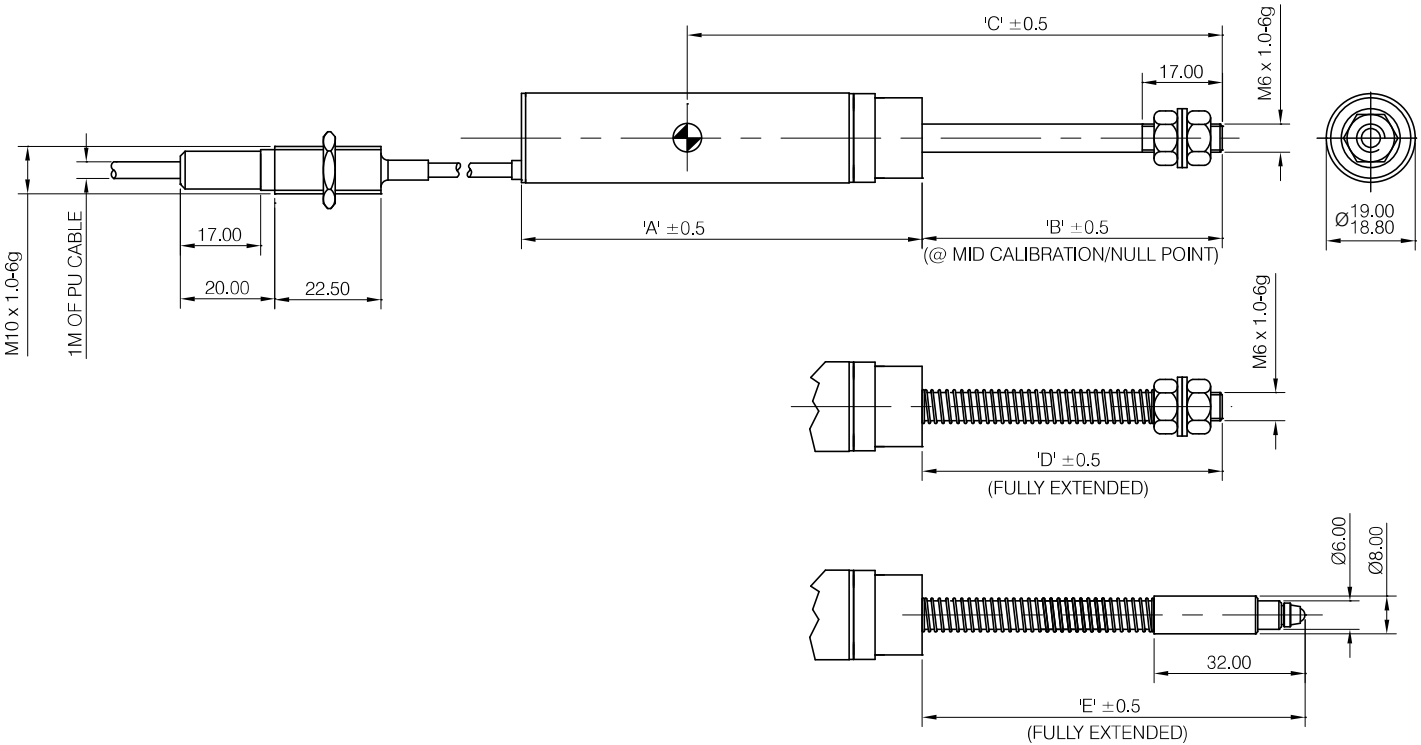
A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Fully Extended
E = Fully Retracted
F = Adaptor Length

Range (mm)		Axial Connector Captive Guided Core						
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All				
		A	A	B	C	D	E	F
±2.5	5	65.9	98.9	44.7	76.4	48.7	41.1	35.0
±5	10	84.9	115.9	48.0	89.5	56.2	41.3	35.0
±7.5	15	91.9	124.4	50.2	95.3	60.7	41.3	35.0
±10	20	106.9	139.9	94.3	146.5	106.2	82.3	76.0
±15	30	117.9	153.9	101.8	161.3	121.2	82.3	76.0
±25	50	142.9	175.9	112.5	182.3	140.2	82.3	76.0

Range (mm)		MI Cable Captive Guided Core						
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All				
		A	A	B	C	D	E	F
±2.5	5	61.0	99.0	45.3	76.4	48.7	41.0	35.0
±5	10	80.0	118.0	49.2	89.5	56.2	41.0	35.0
±7.5	15	87.5	125.5	51.0	95.3	60.7	41.0	35.0
±10	20	102.0	140.0	95.0	146.5	106.2	82.0	76.0
±15	30	116.0	154.0	102.9	161.3	121.2	82.0	76.0
±25	50	138.0	176.0	113.2	182.8	140.2	82.0	76.0

SR series dimensions (mm)

MI Cable / Guided Core

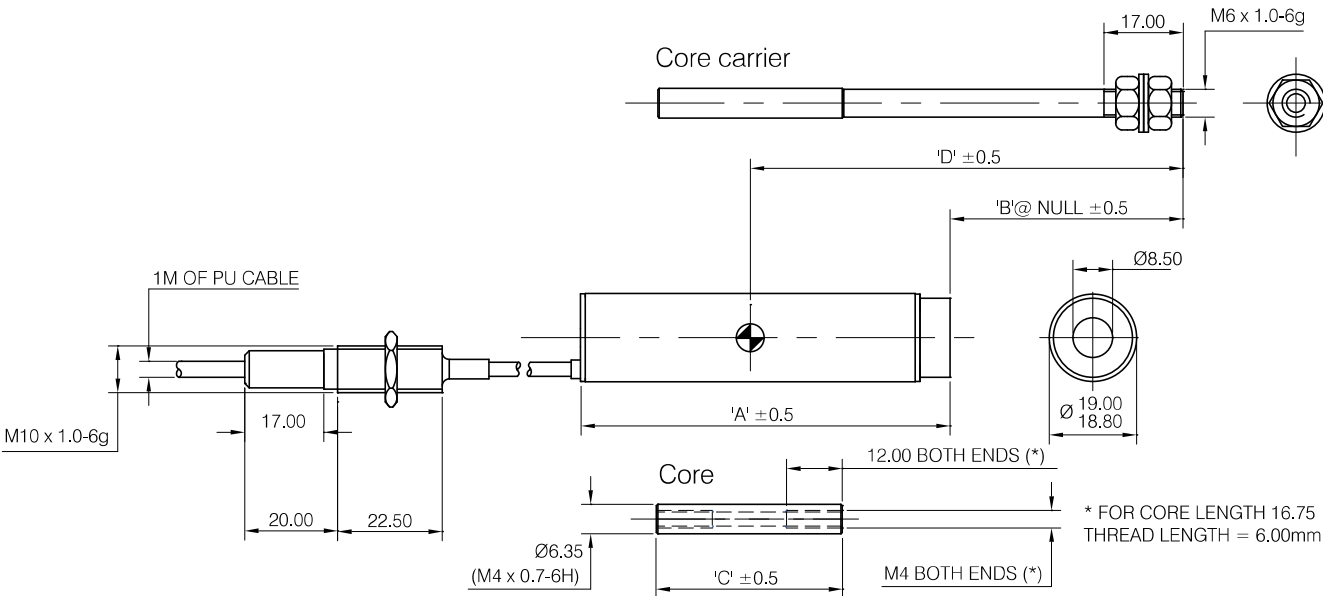


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Fully Extended + Spring Attached
E = Fully Extended + Tip Attached

Range (mm)		MI Cable Guided Core					
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All			
		A	A	B	C	D	E
±2.5	5	63.5	101.5	32.4	66.0	35.8	50.9
±5	10	82.5	120.5	40.3	83.1	46.8	61.9
±7.5	15	90.0	128.0	41.6	88.4	50.8	65.9
±10	20	104.5	142.5	49.1	103.1	61.8	76.9
±15	30	118.5	156.5	59.5	120.4	79.8	94.9
±25	50	140.5	178.5	71.8	143.9	102.8	117.9
±50	100	197.5	235.5	107.2	207.6	160.8	175.9
±75	150	248.5	286.5	152.4	278.6	231.8	246.9

SR series dimensions (mm)

MI Cable / Free Core

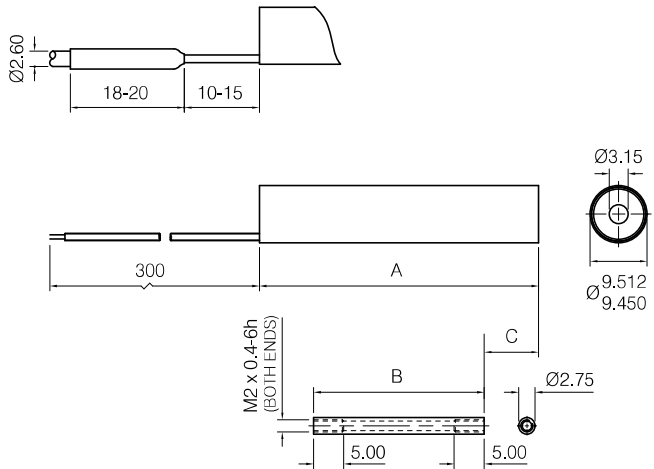


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range

Range (mm)		MI Cable Free Core				
LVDT	DC & 4-20mA	LVDT	DC & 4-20mA	All		
		A	A	B	C	D
±2.5	5	55.6	93.4	37.8	16.75	63.4
±5	10	74.5	112.5	45.7	29.00	80.5
±7.5	15	82.0	120.0	47.0	31.50	85.8
±10	20	96.5	134.5	54.5	39.00	100.5
±15	30	110.5	148.5	64.9	37.50	117.8
±25	50	132.5	170.5	77.2	38.50	141.3
±50	100	189.5	225.2	112.6	50.00	205.0
±75	150	240.5	278.5	157.8	50.00	276.0

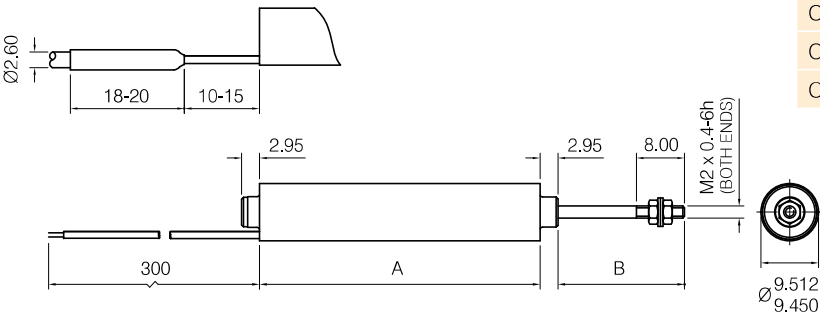
Optimum series dimensions (mm)

Free core



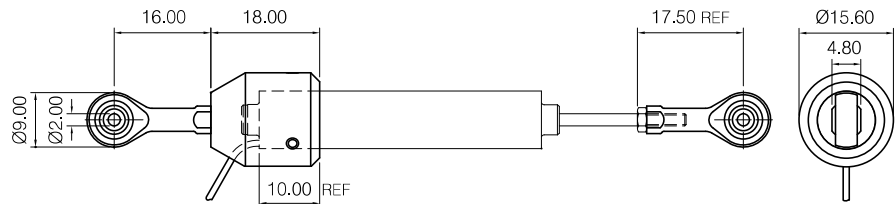
Type	A	B	C at null
OP1.5	20.60	11.00	4.80
OP6.0	46.50	28.40	9.05
OP12.5	83.50	50.80	16.35

Guided core

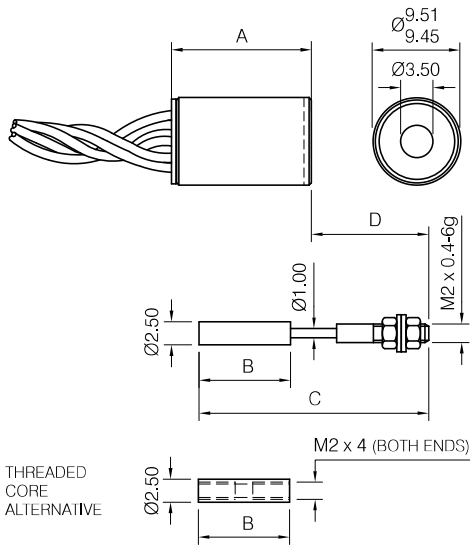


Type	A	B at null
OP1.5	20.60	14.10
OP6.0	46.50	21.00
OP12.5	83.50	31.70

Universal joints

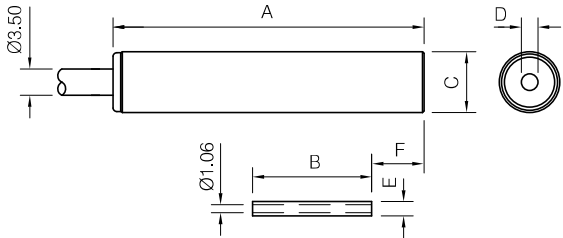


SM series dimensions (mm)



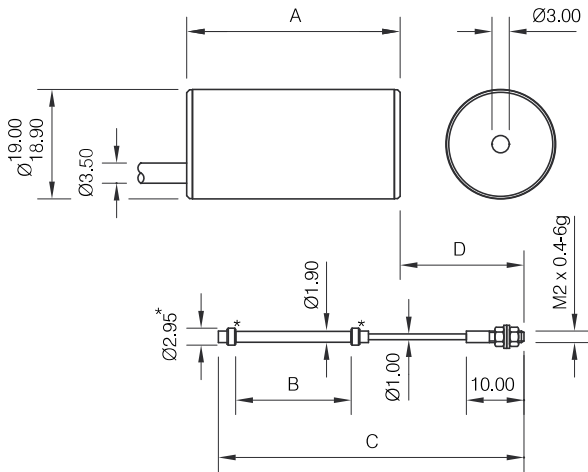
Type	A	B	C	D at null
SM1	15.10/15.25	9.90	24.90	12.70
SM3	34.90/35.05	20.60	42.60	15.30

MD dimensions (mm)



Type	A	B LVDT	B H/B	C	D	E	F at null
M6D1 / M6DH1	28.00	11.00	10.30	Ø6h6	Ø1.95	Ø1.60	2.00
MD1 / MD1H	28.00	11.00	8.85	Ø8h6	Ø2.20	Ø1.90	3.00
MD2.5 / MD2.5H	41.00	15.70	15.00	Ø8h6	Ø2.20	Ø1.90	6.90
MD5 / MD5H	49.00	21.20	18.40	Ø8h6	Ø2.20	Ø1.90	8.40
MD10 / MD10H	68.00	24.40	29.00	Ø8h6	Ø2.20	Ø1.90	16.40

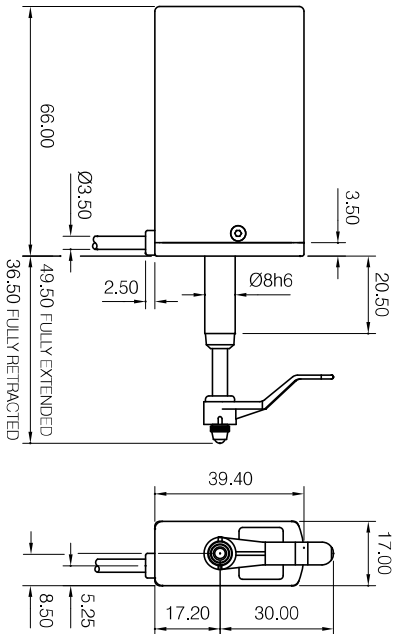
DF series dimensions (mm)



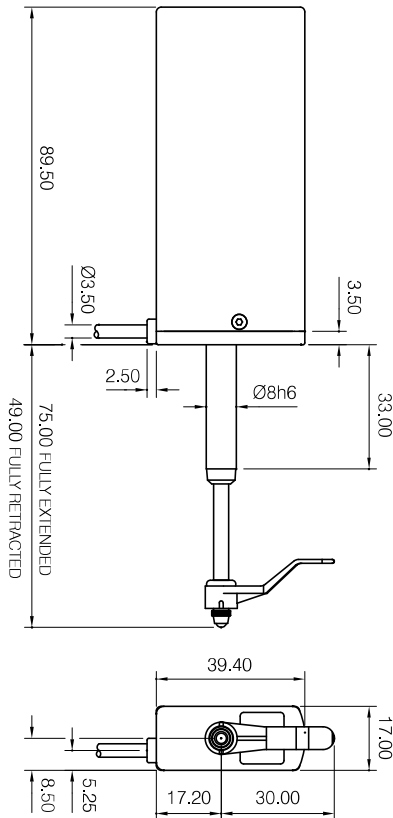
Type	A	B	C	D at null
M6D1 / M6DH1	28.00	11.00	10.30	Ø6h6
MD1 / MD1H	28.00	11.00	8.85	Ø8h6
MD2.5 / MD2.5H	41.00	15.70	15.00	Ø8h6
MD5 / MD5H	49.00	21.20	18.40	Ø8h6

LE Linear Encoders dimensions (mm)

IP50 versions



LE/12/S



LE/25/S

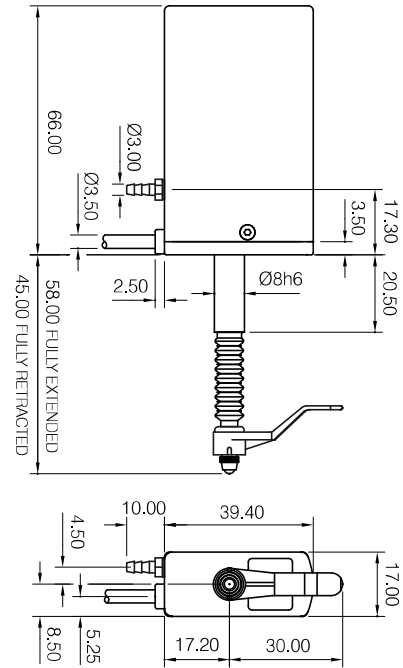
IP60 versions



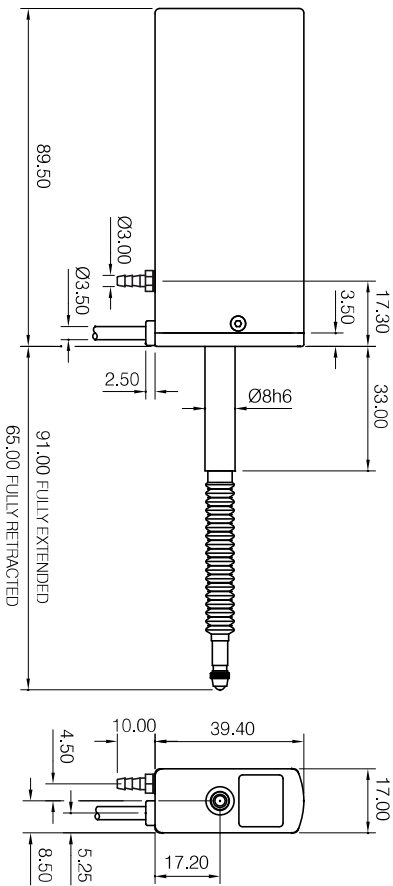
Air inlet nozzle for
pneumatic (P) versions



Lift for spring (S) versions



LE/12/S and LE/12/P



LE/25/S and LE/25/P