solartron metrology

Displacement sensors

including myLVDT A **special** kind of service

AMETEK®
ULTRA PRECISION TECHNOLOGIES

World leaders in linear measurement...

Solartron Metrology is a world leader in the innovation and manufacture of precision digital and analogue displacement sensors, dimensional gauging probes, optical linear encoders and associated instrumentation.

Over 60 years service to industry

Solartron Metrology's origins go back to 1946 with a UK company, Farrol Research and through successive aquisitions by Sangamo Weston, Schlumberger, management, Roxboro Group and AMETEK. We have been known as Sangamo Weston Controls, SangamoTransducers, Schlumberger Industries Transducer Division and ultimately, Solartron Metrology.

Global strength. Local support.

With sales offices in Europe, the Americas, and Asia, and distributors in over 30 countries worldwide, our global network ensures that wherever you are a Solartron Metrology specialist is at hand to provide local service and support. Headquartered in the UK, around 90% of our production is exported.

Quality to the core.

The inherent reliability of Solartron Metrology precision technologies provides consistently accurate performance whilst reducing the cost of ownership. Continuous investment in design and manufacturing ensures that Solartron sensors continue to match and often exceed the expectations of users in industry, research and aerospace.

Where specials come as standard.

Solartron Metrology offer a broad range of both analogue and digital measurement solutions and associated electronics, some capable of withstanding the most extreme environments. Our plug and go Orbit3 digital network is astonishingly simple to configure and use and with the introduction of our MyLVDT specials service, our commitment to customer support extends further than any other manufacturer.

Rest assured that wherever you are, whatever your application, we have the technology, the commitment and the resources to help you make it better.

AMETEK®

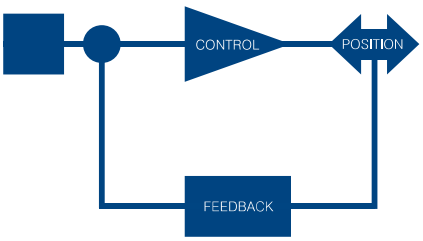
Solartron Metrology is part of AMETEK, a leading global manufacturer of electronic instruments and electric motors.

Contents

Performance products with a twist...

Configure our standard range to create the optimium measurement solution for your application

To create the perfect package for your application...



...combine high performance digital and analogue data collection...

The culmination of Solartron's 50+ years of experience manufacturing LVDT displacement sensors is a deep understanding of the need to match the performance of a sensor precisely to the demands of the application and environment. The cost and performance advantage in matching the best sensor to the requirement is clear, this can only be done with a company that has both an extensive range of sensors, accessories and electronics in conjunction with a philosophy of designing "My LVDT" to customers specific requirements.

CONTROL

POSITION

...with powerful, flexible and resilient data processing...

An extensive range of analogue and digital sensors requires an equally extensive range of electronics and signal conditioning. The ability to transfer fast relaible data from a sensor even in harsh environments is made possible by Solartron's well proven Orbit3 Sensor Network. Orbit3 introduces the abiity to network third party sensors such as pressure, force, strain and temperature using a common protocol.

...for precision linear measurement whatever your industry.

Solartron precision measurement solutions perform vital tasks in a diverse range of throughout industries including...

Aerospace, pharmaceutical, medical, power generation, oil and gas, paper making, civil engineering, tunneling, semiconductor manufacturing, mining, glass making, water treatment, chemical processing, steel production...

The list is endless.

FEEDBACK

myLVDT

A **special** kind of service

At Solartron Metrology our vastly experienced design team has for many years, collaborated with customers' design teams to produce successful and cost effective bespoke measurement solutions.

Drawing on this experience MyLVDT formalises this approach and puts our expertise in the spotlight.

With a knowledge base of sensor, electronics and software design spanning decades, we can work with you to identify, design, prototype and manufacture a novel solution to fit your application and your budget.

If you have a seemingly intractable llinear measurement problem we need to talk.

MyLVDT: a **special** kind of service

Measuring range
1 mm to > 1 m

Accuracy
Microns

Your input...

my

Engineering
Coil design
Mathematical modelling
3D CAD

Specials as standard
High speed modular design

The path to measurement perfection

Consultation

Specification agreement

3D modelling

Sensor dimensions
Sub miniature
to long range

Environmental protection
Temperature
Vibration
Shock
Hermetic
Submersible...

Mechanical
Carrier
Springs
Rod ends

Electrical
Power supply
Internal electronics
External electronics
Output type

LVDT

...our output.

Manufacture
Advanced
machine shop
Precision coil
winding

Networked solutions
Orbit®

Quality systems
ISO 9000
ATEX

Global technical support
Asia, Europe, USA

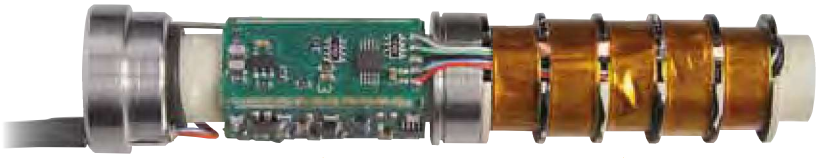
Prototyping

Manufacture

Result: the precise position sensing package for your exact application

Quality to the core

Simplicity of operation is the main strength of an LVDT, but to produce a reliable and stable sensor requires meticulous attention to detail in its design and manufacture.



Highly stable and clean signal conditioning is essential to get the best performance from an LVDT sensor.

Precision wound coils on highly stable bobbins provide excellent linearity and temperature coefficients.

Mu metal screening gives improved protection against electromagnetic fields on some models.

Electron beam welding on all submersible sensors ensures that there is no contamination within the weld that can lead to corrosion.

Solartron's sensor bodies, core carriers and end caps are made from high grade stainless steel.

A universal truth: data is only of true value when it is processed from a reliable source...

Integral electronics, high performance external electronics, single or multichannel digital communication from absolute displacement sensors provide the ultimate in system performance.

Tried, tested and approved...

CE RoHS Compliant

Core technology

Principle of operation

An LVDT Displacement Sensor works by moving the core through the body. The position of the core within the body is detected by coils wound on the bobbin.

The coils are supplied with an ac signal and return an ac signal. This signal is then processed by conditioning electronics to provide a measure of the core position.

The body is normally mounted on the static part of an element and the core attached to the moving part.

Core benefits

Absolute positioning

Does not lose position during a power down and does not suffer from over speeding like incremental sensors making it ideal for closed loop control.

Ruggedness

With good choice of materials and design the Displacement Sensor is perfect for harsh environments.

Infinite resolution

Ideal for detecting very small changes of position when used with Solartron's precision signal conditioning.

Repeatable

Sub micron repeatability provides perfect limit or closeloop control.

Dynamic response

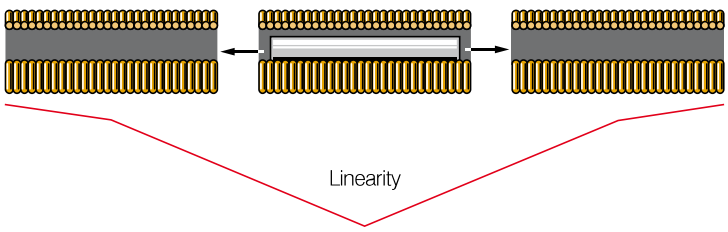
Free core sensors, fitted with low mass cores provide excellent dynamic response up to several kHz when used with Solartron's precision signal conditioning.

Flexibility

Solartron's design engineers can design sensors to fit your application. (MyLVDT).

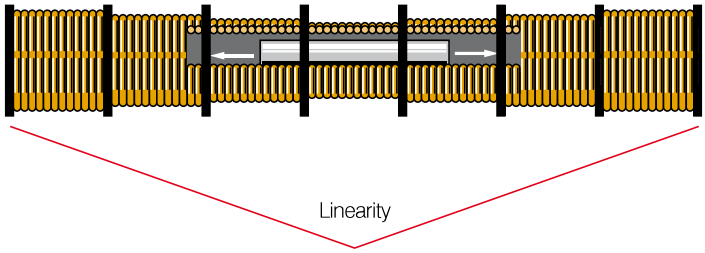
Conventional LVDT

When the core is in a central position, the coupling from the primary (V_{EXC}) to each secondary is equal, so $V_A = V_B$ and the output $V_{OUT} = 0$. As the core is displaced V_A differs from V_B, and the output V_{OUT} changes in magnitude and phase in proportion to the movement.



Solartron LVDT

Solartron Metrology's continuous development of precision bobbin mouldings and multi chambered coil windings ensure excellent linearity and thermal stability throughout the range.

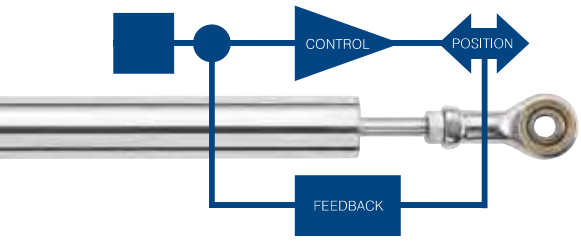


Solartron Orbit3 digital sensors

Solartron Metrology digital sensors are calibrated using a traceable interferometer and are issued with a calibration certificate. All digital sensors are fitted with integrated electronics, which store information such as probe ID, range, calibration error, etc. Digital sensors provide superior performance compared to traditional analogue sensors. Performance figures quoted in this catalogue include all mechanical errors within the probe head together with any errors in the electronics interface modules.

Applications in industry

Position feedback



Examples

- Position feedback
- Level measurement
- Machine alignment
- Assembly checking
- Injection monitoring
- Close loop control
- Tool positioning
- Movement control
- Lift position control
- Distance control

Energy
Power generation
Wind turbine
Oil and gas

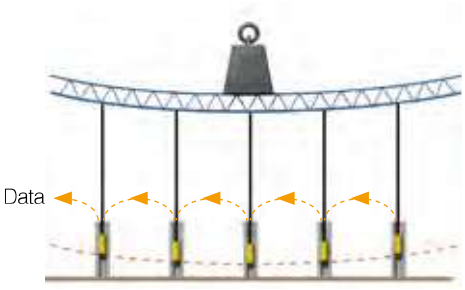
Transport
Aerospace
Rail
Off-highway
Automotive
Drones

Fluid power
Hydraulics
Servo valves
Pneumatics
Solenoids

Automation
Assemby
Robotics
Electronics
Mechatronics
Metal forming

Applications in laboratory and test

Displacement measurement



Examples

- Cracks monitoring
- Structure monitoring
- Alignment measurement
- Deformation measurement
- Expansion displacement
- Contraction displacement
- Crush displacement
- Deflection measurement
- Research

Test machines
Traction
Compression
Creep & Stress
Flexion
Fatigue

Structures
Building
Bridge
Barrage
Cracks
Soil

Metrology
Hardness
CMM
Calibrators
Dimension

Bench test
Wood
Metal
Aerospace
Agronomy
Automotive

S series

High performance displacement sensors

- <0.2% Linearity
- 19mm Stainless Steel body
- IP65 and IP67 option
- Excellent measuring range to body length
- Multiple output options with integrated electronics
- Large bore to core clearance for ease of installation
- Excellent magnetic screening
- Wide range of signal conditioning and instrumentation

The S Series Displacement Sensor is the cumulation of many years experience gained from Solatron's pedigree of a history of excellent displacement sensors coupled with attention to market feedback. The result is a large range of sensors both "off the shelf" and "customer specials" that is better able to satisfy today's demanding manufacturing and research applications.

The S base series has been expanded to include the SR (Rugged range).

Standard output options
LVDT
±5V DC
±10V DC
0-5V DC
5-0V DC
0-10V DC
10-0V DC
4-20 mA
20-4 mA
Solartron Orbit (Digital)
TTL

Mechanical options
Free Core
Free Core /Carrier
Guided Core
Tip
Spring
Universal Joints

For non-standard sensors please contact your local Solartron Sales Office or Distributor (see back cover)

Connection options
Cable (wire ends)
Cable + Connector
Axial Connector
PIE (Orbit digital only)

Also see...	
Sensor dimensions/drawings	Page 28
Orbit interface dimensions/drawings	Page 41

Generic Sensor types										
LVDT Voltage Output (±DC Bipolar) Voltage Output (DC Unipolar) Current Output (4-20mA) Digital Output (Orbit)	AS/2.5 VS/2.5 VS/5 IS/5 DS/5	AS/5 VS/5 VS/10 IS/10 DS/10	AS/7.5 VS/7.5 VS/15 IS/15 DS/15	AS/10 VS/10 VS/20 IS/20 DS/20	AS/15 VS/15 VS/30 IS/30 DS/30	AS/25 VS/25 VS/50 IS/50 DS/50	AS/50 VS/50 VS/100 IS/100 DS/100	AS/75 VS/75 VS/150 IS/150 DS/150	AS/100 VS/100 VS/200 IS/200 DS/200	AS/150 VS/150 VS/300 IS/300 DS/300
Measurement										
Measurement Range (LVDT/±DC) (mm)	±2.5	±5	±7.5	±10	±15	±25	±50	±75	±100	±150
Measurement Range (4-20mA/DC/ORBIT) (mm)	5	10	15	20	30	50	100	150	200	300
Pre-travel ±0.5 mm (Guided Versions only)	2.0	3.0	1.6	3.1	6.7	6.9	4.9	5.0	8.8	16.2
Post Travel ±0.5 mm (Guided Versions only)	4.3	5.3	3.9	5.6	9.0	9.3	7.3	7.4	11.1	18.6
Linearity (% FSO)	<0.20									<0.25
Resolution μm[1]	<0.1	<0.1	<0.1	<0.2	<0.2	<0.3	<0.5	<0.7	<1.0	<2.0
Temperature Coefficients (%FSO/°C) LVDT	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.015	<0.01	<0.01
Temperature Coefficients (%FSO/°C) DC/4-20mA	< 0.01									
Mechanical										
Body diameter (mm)	19 (+0.0, -0.2)									
Case material	300 Series Stainless Steel									
Core material	Nickel Iron									
Tip Force ±20% (Horizontal at middle of range) N	1.1	1.0	1.0	1.1	1.2	1.5	2.1	1.9	2.3	2.6
Cable Type	F.E.P.									
Standard cable Length (m)	3									
Standard cable Style	B									
Nominal Mass (g) LVDT	58	66	67	80	92	110	153	167	243	344
Nominal Mass (g) (4-20mA/DC)	72	80	81	94	106	124	167	181	257	358
Nominal Mass of Core (g)	2.6	5.0	5.8	7.2	6.4	6.6	9.0	9.0	9.0	9.0
Environment										
Temperature (Standard LVDT) (°C)	-40 to +120									
Temperature (HT LVDT)) (°C)	-40 to +200									
Operating/Storage Temperature (4-20mA/DC) (°C)	0 to +65 / -20 to 85									
Sealing	IP65 or IP67									
Vibration Sinusoidal	1 to 10g rms linear 10 to 50 Hz & 10g rms 50Hz to 1kHz									
Vibration Random	DO160F Curve D									
Shock	Drop test from 1m onto hard surface									
Electrical Interface (LVDT)										
Energising Voltage	1-10 (Vrms)									
Energising Current at 5kHz (mA/V)	1.0	2.6	2.2	0.7	1.5	0.5	0.6	2.5	1.65	1.83
Sensitivity at 5kHz ±10% mV/V/mm	144	178	121	76	60	21.5	15	10.5	6.9	3.9
Electrical Interface (4-20mA & DC)										
Input	10 to 30 V or 4-20mA loop powered									
Noise (DC Output) measured in 500Hz	<0.2 mV									
Output Change with Power Supply Variation	<0.5 mV									
Bandwidth (-3dB)	500Hz									
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 T connector (including DIN rail adaptor)	52 46									

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

SR series

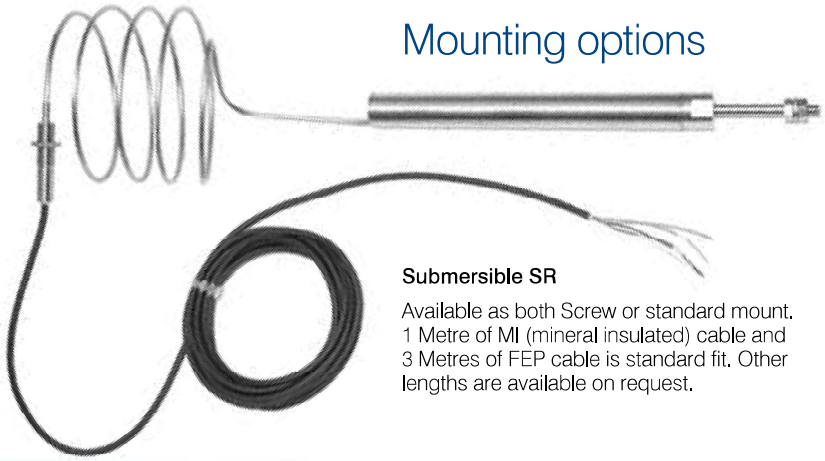
High performance **rugged** displacement sensors

- Rugged construction for use in demanding environments
- Pressure tested to 100 bar
- 0.2% Linearity
- 19mm Stainless Steel body and core carrier
- IP68 with axial connector
- Multiple output options with integrated electronics
- Screw Mount Options
- Excellent magnetic screening

Solartrons well proven and popular S Series provided the ideal platform for the SR ruggedized sensor range, specifically developed for challenging environments in lab & test and process control applications.

Environmental ratings for the SR series have been increased to IP68 or fully Hermetically sealed. Extra high temperature versions are also available in LVDT format and Orbit Digital (sensor only).

Mounting options



Submersible SR

Available as both Screw or standard mount. 1 Metre of MI (mineral insulated) cable and 3 Metres of FEP cable is standard fit. Other lengths are available on request.

Standard Mount

Standard Mount sensors are available as Free Core or Guided armature. Spring Return is an optional extra with an external spring on guided versions. Measuring ranges (total) 5mm to 300mm.

Screw Mount

Screw Mount sensors have a Captive Armature with an anti-rotation guide and an internal spring. Measuring ranges (total) from 5mm to 150mm.

Standard output options
LVDT
±5V DC
±10V DC
0-5V DC
5-0V DC
0-10V DC
10-0V DC
4-20 mA
20-4 mA
Solartron Orbit (Digital)

Mechanical options
Free Core
Free Core /Carrier
Guided Core
Captive Guided Core
Tip
Spring

For non-standard sensors please contact your loca; Solartron Sales Office or Distributor (see back cover)

Connection options
Cable (wire ends)
Cable + Connector
MI Cable
Axial Connector
PIE (Orbit digital only)

Generic sensor Types								
LVDT Voltage Output (±DC Bipolar) Voltage Output (DC Unipolar) Current Output (4-20mA) Digital Output (Orbit)	RAS/2.5 RVS/2.5 RVS/5 RIS/5 RDS/5	RAS/5 RVS/5 RVS/10 RIS/10 RDS/10	RAS/7.5 RVS/7.5 RVS/15 RIS/15 RDS/15	RAS/10 RVS/10 RVS/20 RIS/20 RDS/20	RAS/15 RVS/15 RVS/30 RIS/30 RDS/30	RAS/25 RVS/25 RVS/50 RIS/50 RDS/50	RAS/50 RVS/50 RVS/100 RIS/100 RDS/100	RAS/75 RVS/75 RVS/150 RIS/150 RDS/150
Measurement								
Measurement Range (LVDT/±DC) (mm)	±2.5	±5	±7.5	±10	±15	±25	±50	±75
Measurement Range (4-20mA/DC/ORBIT) (mm)	5	10	15	20	30	50	100	150
Pre-travel ±0.5 mm (Guided Versions only)	1.5	2.7	2.5	3.4	6.4	6.6	4.6	4.7
Post Travel ±0.5 mm (Guided Versions only)	1.1	1.7	1.4	2	4.5	5.3	3.8	3.7
Linearity (% FSO)	0.20							
Resolution μm^1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.3	<0.5	<0.7
Temperature Coefficients (%FSO/°C) LVDT	<0.022	<0.016	<0.032	<0.031	<0.013	<0.015	<0.025	<0.026
Temperature Coefficients (%FSO/°C) DC/4-20mA	<0.03							
Mechanical								
Body diameter (mm)	19 (+0.0, -0.2)							
Case material	300 Series Stainless Steel							
Tip Force ±20% (Horizontal at middle of range) N	1.0	0.9	1.0	1.1	1.2	1.5	2.1	1.9
Cable Type	Mineral Insulated + F.E.P.							
Standard cable Length (m)	3							
Standard cable Style	TYPE MIL-C-26482 Series 1							
Nominal Mass (g) LVDT	59	65	72	81	93	110	151	190
Nominal Mass (g) (4-20mA/DC)	76	87	95	101	121	136	176	216
Nominal Mass of Core (g)	2.6	5.0	5.8	7.2	6.4	6.6	9.0	9.0
Environment								
Operating/Storage Temperature (LVDT) (°C)	-40 to +120 / -40 to +120							
Operating/Storage Temperature (4-20mA/DC) (°C)	0 to +65 / -20 to 85							
Sealing	IP68 with axial connector. Sealed up to 100 bar with MI cable							
Vibration Sinusoidal	1 to 10g rms linear 10 to 50 Hz & 10g rms 50Hz to 1kHz							
Vibration Random	DO160F Curve D							
Shock	Drop test from 1m onto hard surface							
Electrical Interface (LVDT)								
Energising Voltage	1-10 (Vrms)							
Energising Current at 5kHz (mA/V)	1.0	2.6	2.2	0.7	1.5	0.5	0.6	2.5
Sensitivity at 5kHz ±10% mV/V/mm	139	125	59.5	60	52.5	17.7	11.8	8.4
Electrical Interface (4-20mA & DC)								
Input	10 to 30 V or 4-20mA loop powered							
Noise (DC Output) measured in 500Hz	<0.2 mV							
Output Change with Power Supply Variation	<0.5 mV							
Bandwidth (-3dB)	500Hz							
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 T connector (including DIN rail adaptor)	52 46							

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.

Also see...	
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Orbit interface dimensions/drawings	Page 41

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 posible to mount the core and carrier on the moving part.

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

Sensor					
LVDT Free Core	OP/1.5/F	OP/6/F	OP/10/F	OP/12.5/F	OP/25/F
LVDT Guided	OP/1.5/G	OP/6/G	OP/10/G	OP/12.5/G	OP/25/G
ORBIT Digital Guided	DO/3	DO/12	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	2.33	TBA
Linearity (% FSO)	<0.25				
Resolution μm[1]	<0.1			<0.2	<0.4
Temperature Coefficients (%FSO/°C)	<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	93	TBA
Cable Type	F.E.P.				
Standard cable Length (m)	5 (max)				
Standard cable Style	A or B				
Nominal Mass (g)	7	12	12	20	TBA
Nominal Mass of Moving Parts (g)	1.5	2.5	2.0	3.5	TBA
Environment					
Operating Temperature (Sensor) (°C)	-40 to +150				
Storage Temperature (Sensor) (°C)	-40 to +150				
Sealing	IP65				
Electrical Interface (LVDT)					
Energising Voltage	1-10 (Vrms)				
Energising Current at 5kHz (mA/V)	6	4.5	3.2 at 20 kHz	7	TBA
Frequency Response (-3db) Hz	Depends on Electronics and Sensor Configuration				
Sensitivity at 5kHz ±10% mV/V/mm	108	78	85 at 20 kHz	69	TBA
Zero phase frequency (kHz)	13.1	24.1	>30	24.8	TBA
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 T connector (including DIN rail adaptor)	52 46				

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...	
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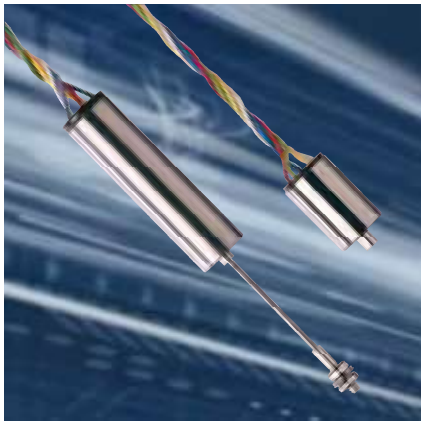
SM/MD/DF series

Miniature displacement sensors

SM



- Rugged construction
- Short body length
- Good performance

SM sensors cover two standard types in two measurement ranges ±1mm and ±3mm. 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.

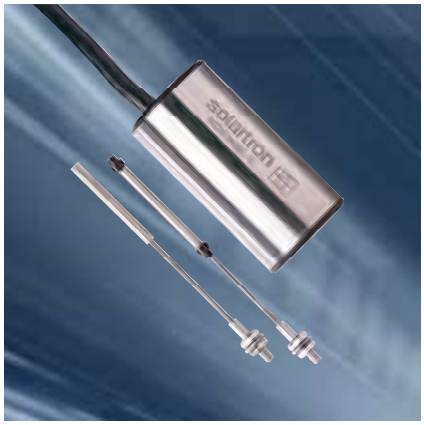
MD

- 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

Also see...	
Dimensions and drawings	Page 38 ▶

orbit3 digital network

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

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

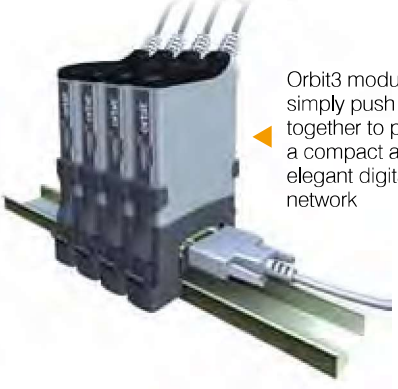
Orbit supports a number of different measurement modes for different applications.
In Standard mode each module is read as required whereas Dynamic mode provides a means of rapidly reading synchronised modules up to 3096 readings per second.

Network components

Attached to the end of each sensor is a hot swappable PIE (Probe Interface Electronics) which clips into a T-CON nertwork 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), contoller 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

orbit3 controllers and modules

Controllers

- USB, RS232 and ethernet interfaces

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		

Modules

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

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	Emmisions: 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 T connector (including DIN rail adaptor)	52 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 0.1um (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/fi ne 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.xxxx (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

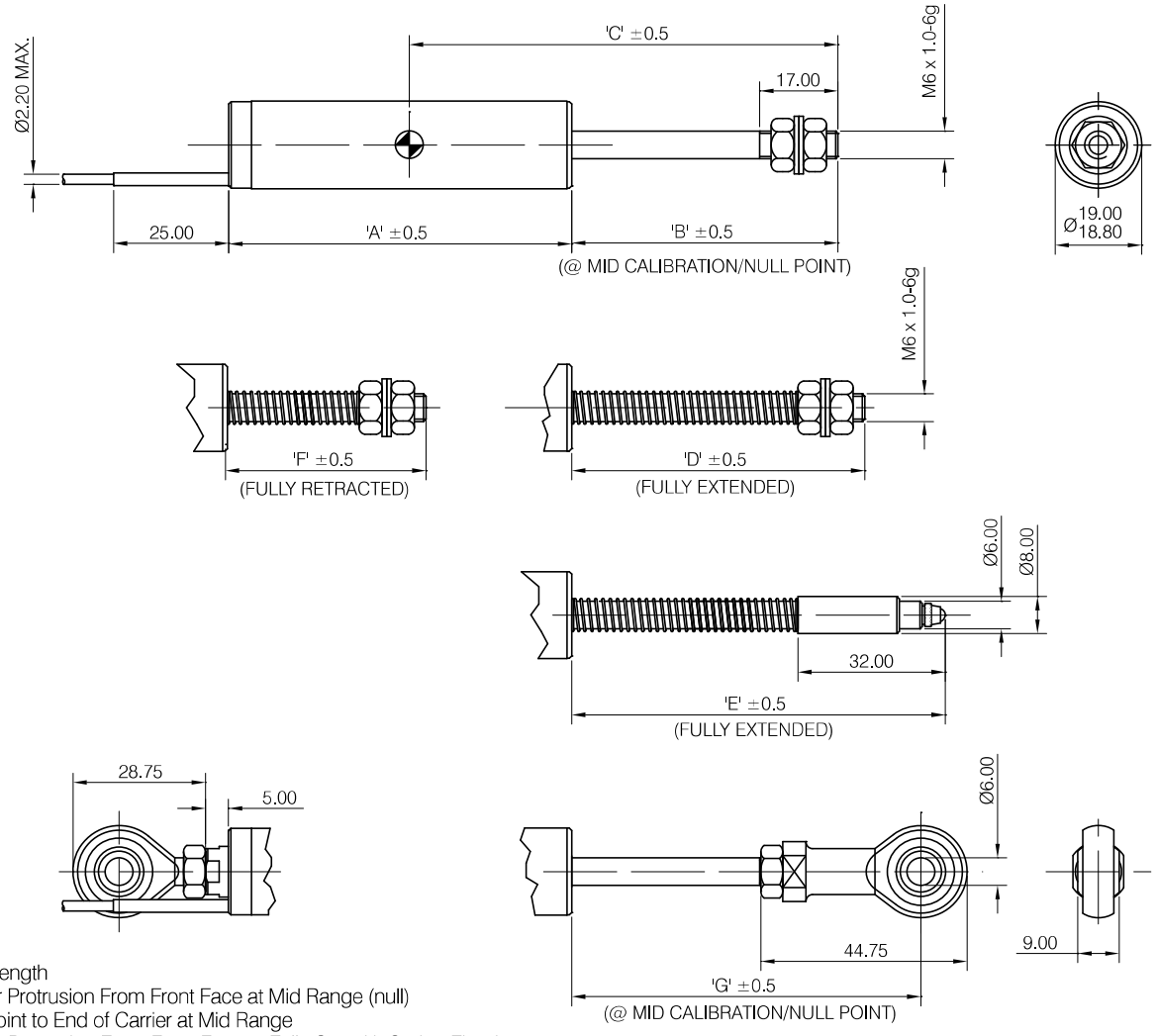
Module	ATM TTL converter
Measurement	
Sensor types	All Solartron Displacement Sensors
Accuracy (%FSO)	<0.25
Resolution (x4 interpolation)	0.1
Repeatability	sensor dependent
Electrical	
Power	+5 ±0.25 VDC @ 100 mA
Output Signal	A and B, /A and /B TTL square waves RS422 levels
Output frequency (kHz)	50, 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

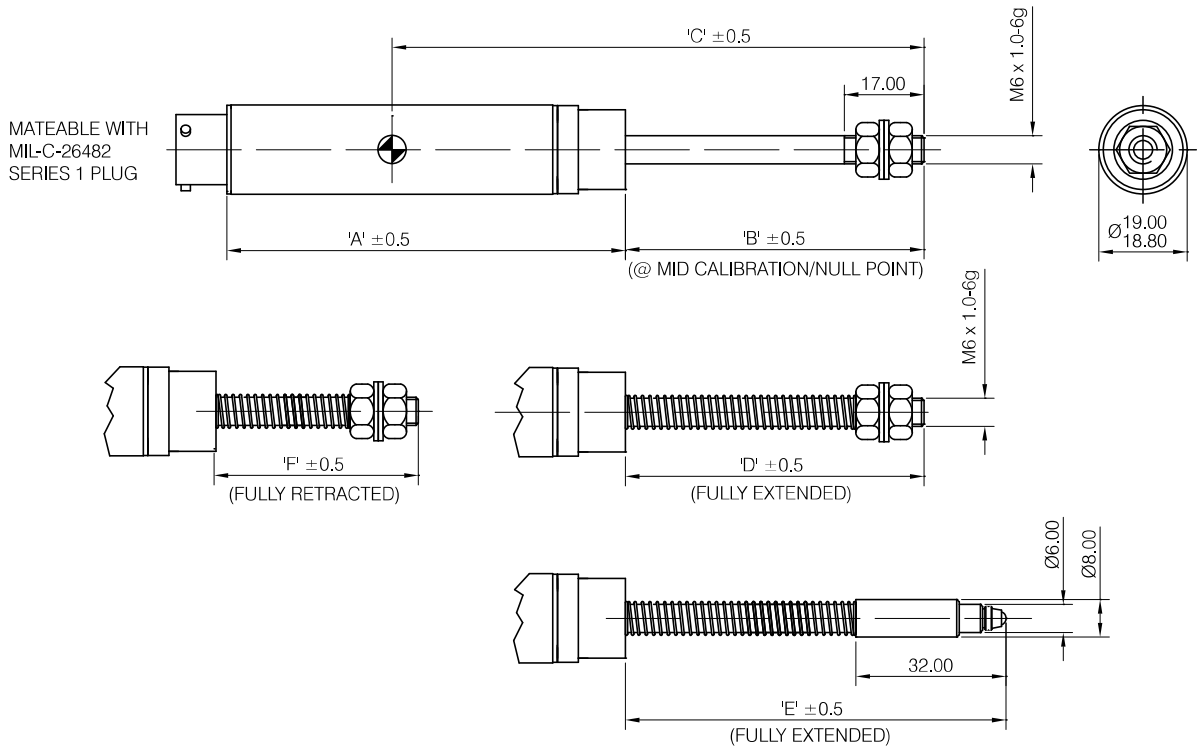


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Carrier Protrusion From Front Face at Fully Out with Spring Fitted
E = Carrier Protrusion From Front Face at Fully Out with Tip Fitted
F = Carrier Protrusion From Front Face Fully 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

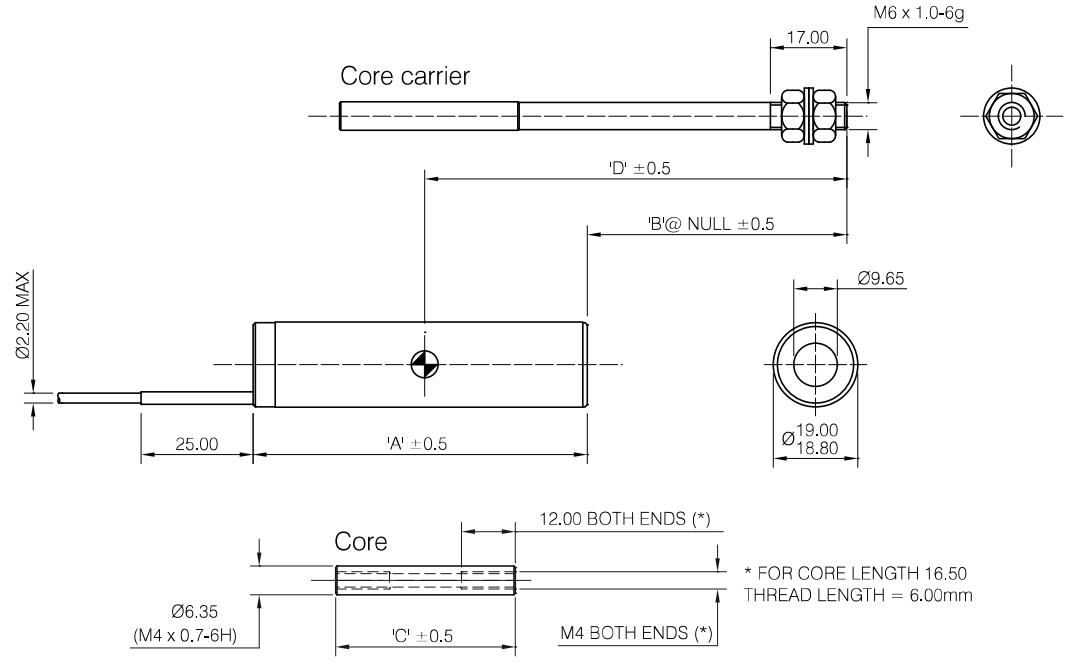


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Carrier Protrusion From Front Face Fully Extended
E = Carrier Protrusion From Front Face Fully Extended + Tip Fitted
F = Carrier Protrusion From Front Face Fully Retracted
CF =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

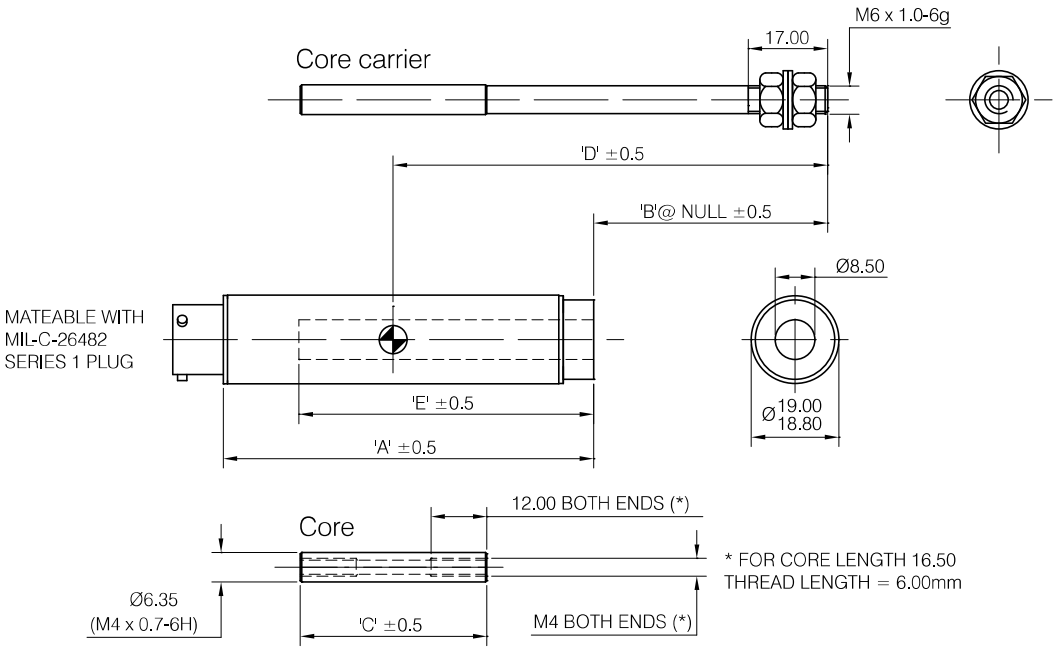


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range

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

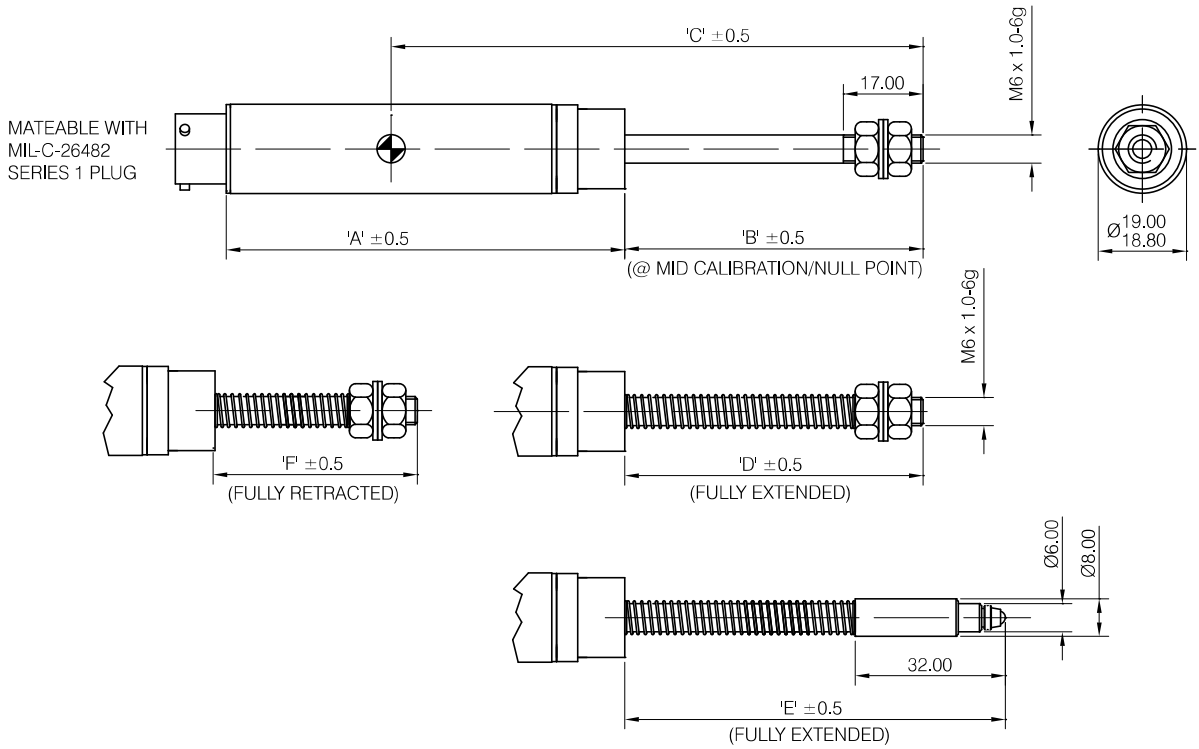


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Bore Depth (minimum)

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

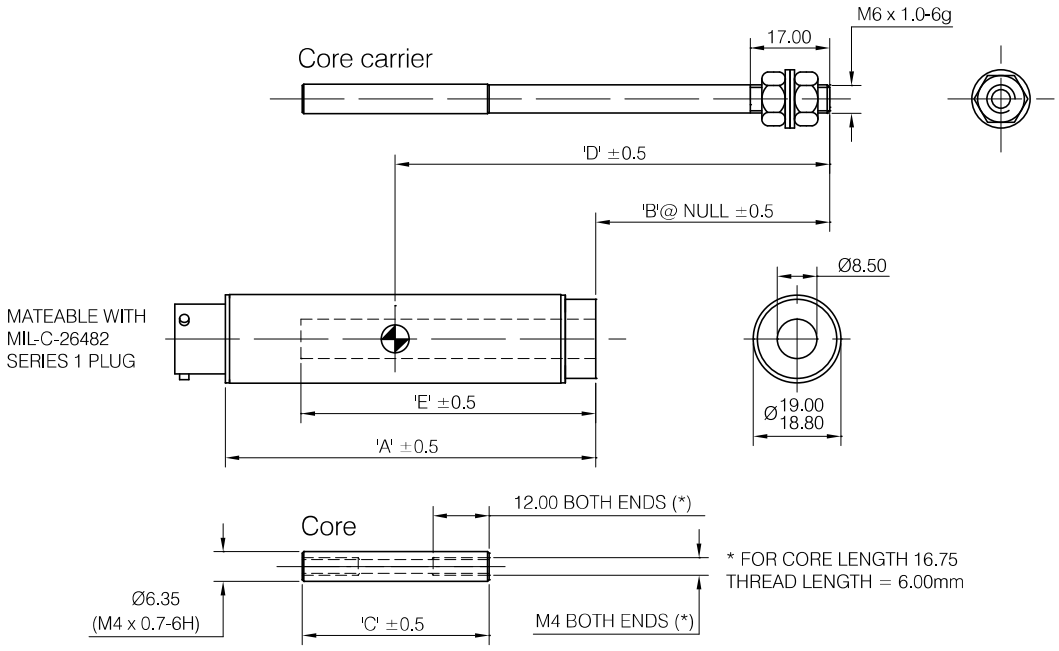


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Fully Extended + Tip Attached
F = Fully Retracted

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

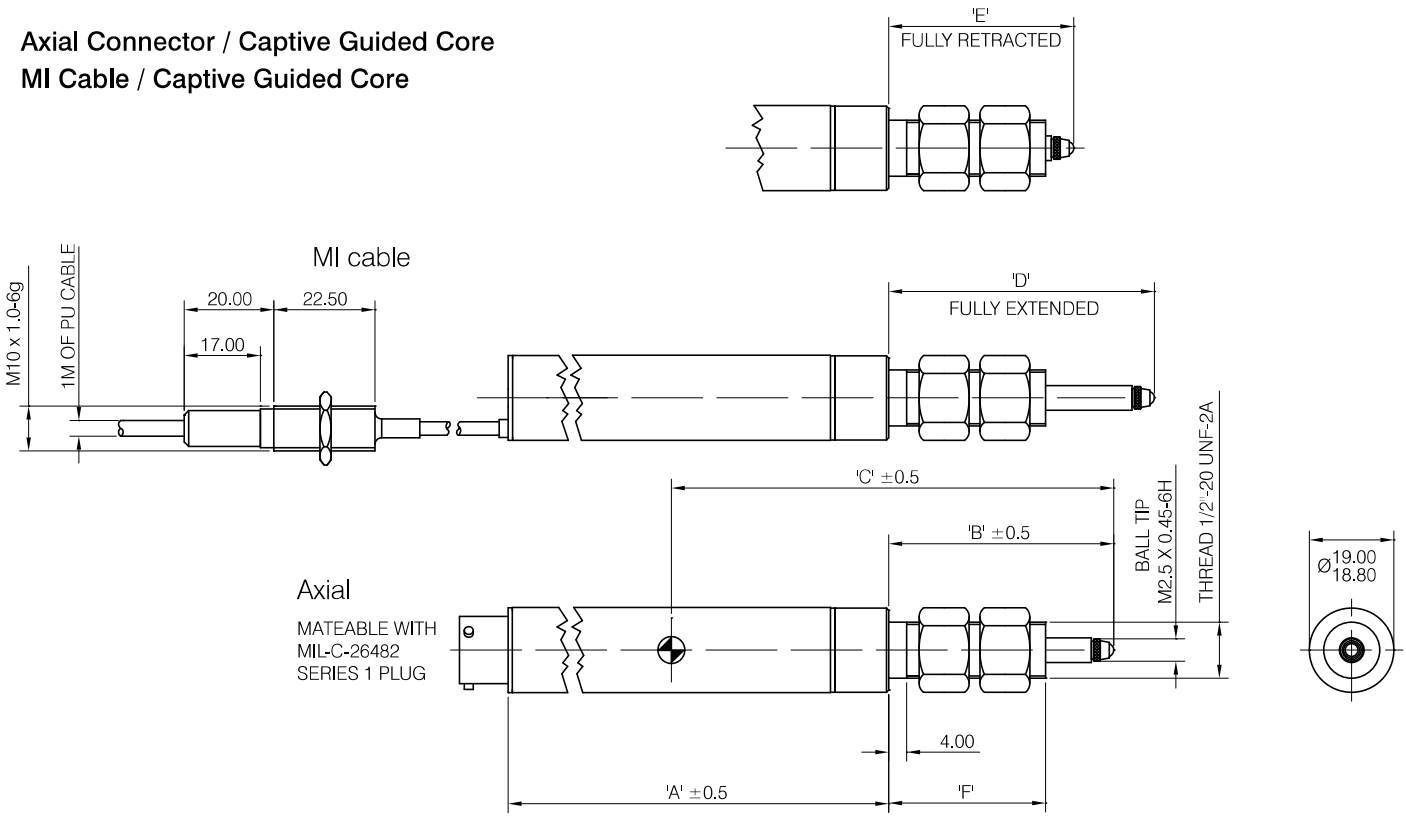


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range
E = Bore Depth

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



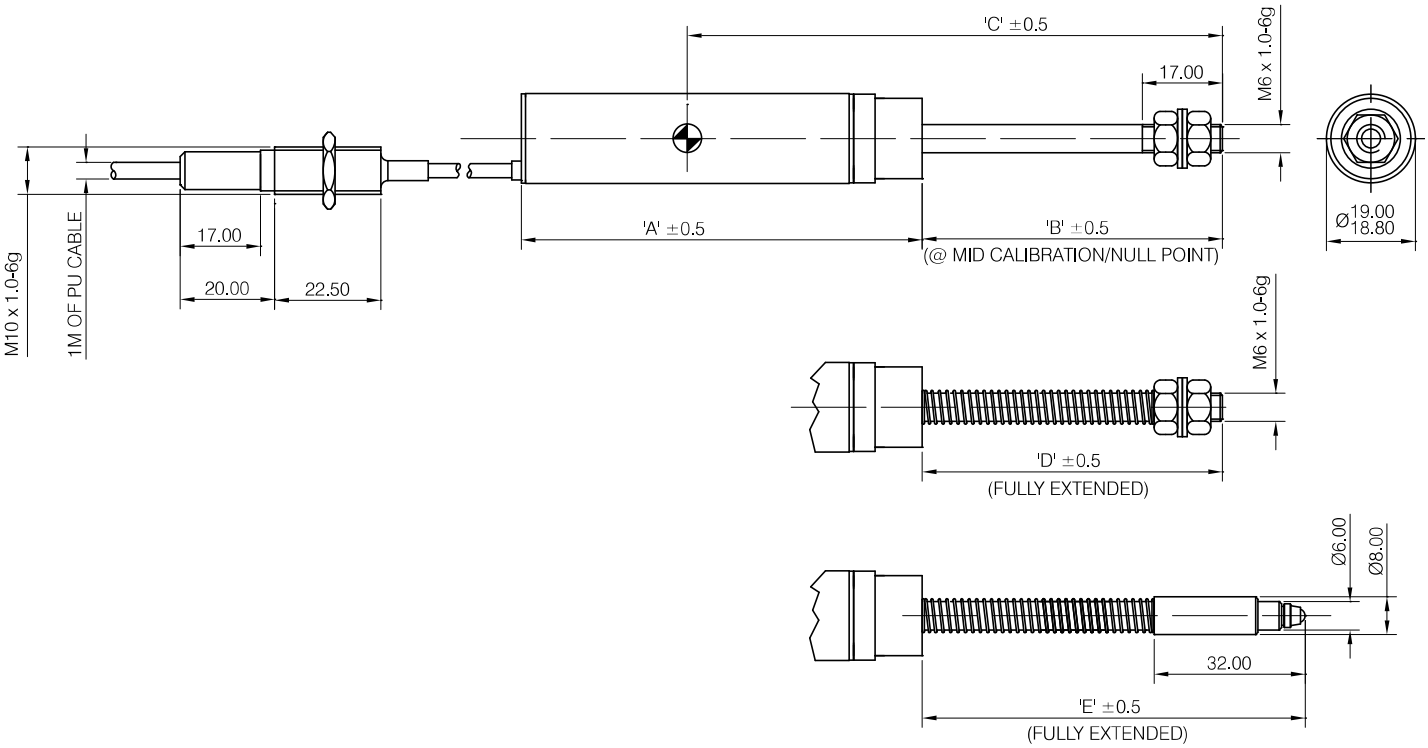
A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Fully Extended
E = Fully Retracted
F = Adaptor Length

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

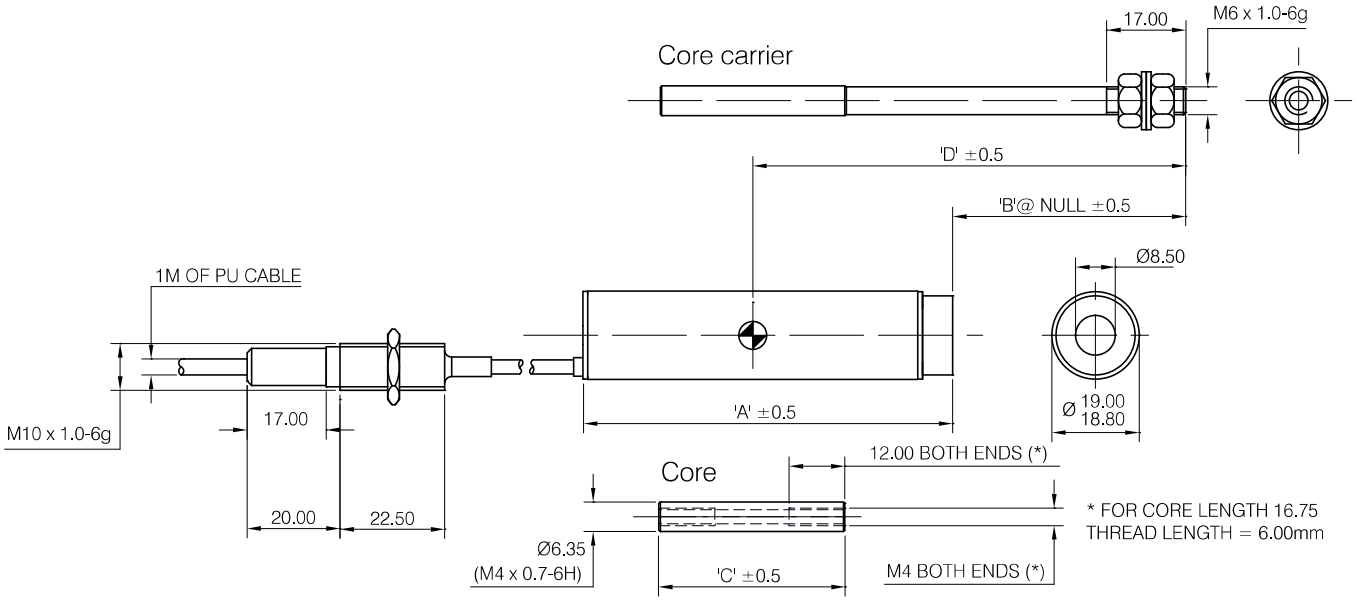


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Null Point to End of Carrier at Mid Range
D = Fully Extended + Spring Attached
E = Fully Extended + Tip Attached

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

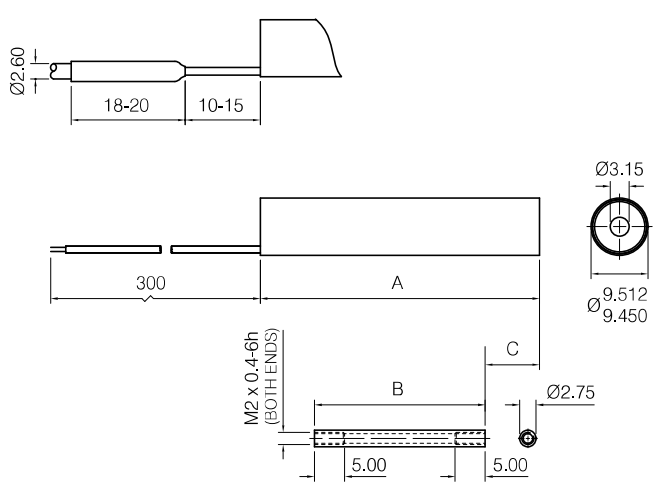


A = Body length
B = Carrier Protrusion From Front Face at Mid Range (null)
C = Core Length
D = Null Point to End of Carrier at Mid Range

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

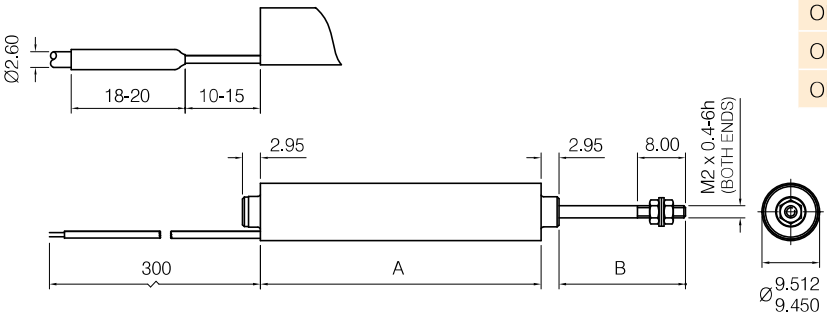
Optimum series dimensions (mm)

Free core



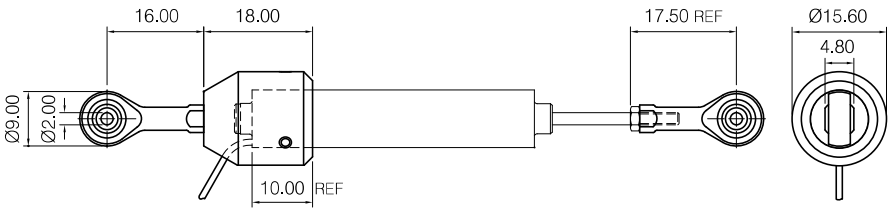
Type	A	B	C at null
OP1.5	20.60	11.00	4.80
OP6.0	46.50	28.40	9.05
OP12.5	83.50	50.80	16.35

Guided core

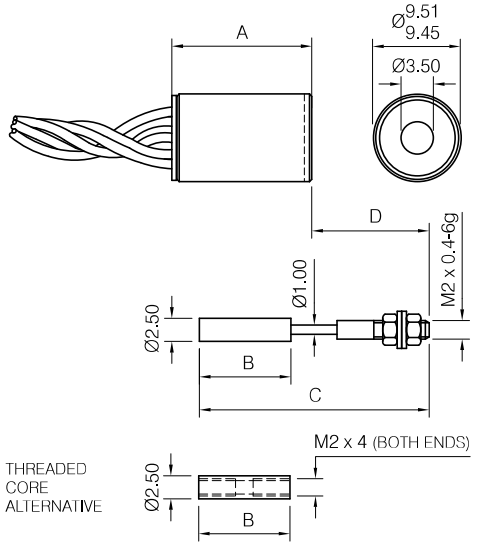


Type	A	B at null
OP1.5	20.60	14.10
OP6.0	46.50	21.00
OP12.5	83.50	31.70

Universal joints

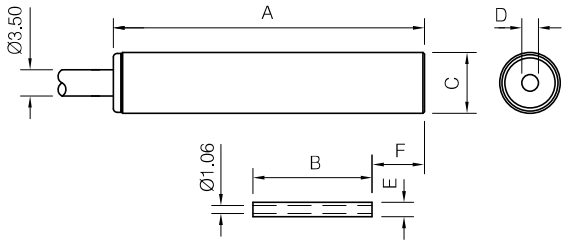


SM series dimensions (mm)



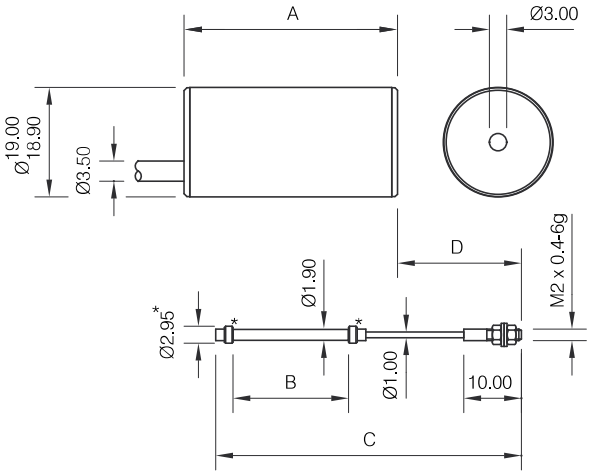
Type	A	B	C	D at null
SM1	15.10/15.25	9.90	24.90	12.70
SM3	34.90/35.05	20.60	42.60	15.30

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

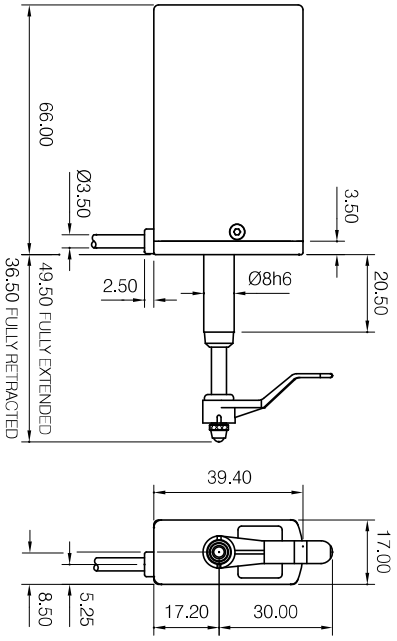
DF series dimensions (mm)



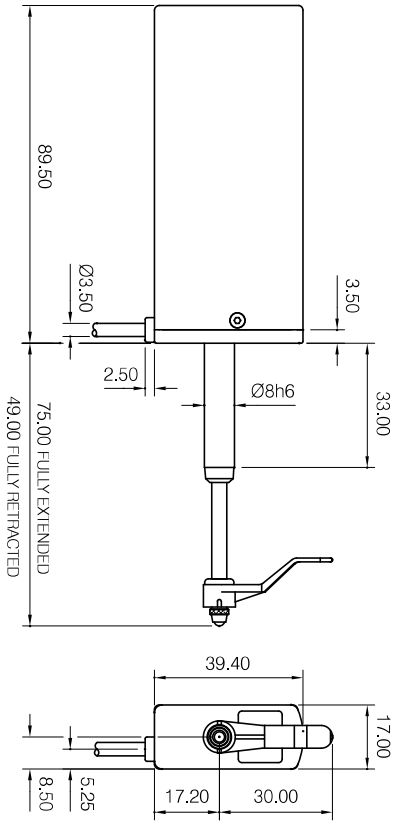
Type	A	B	C	D at null
M6D1 / M6DH1	28.00	11.00	10.30	Ø6h6
MD1 / MD1H	28.00	11.00	8.85	Ø8h6
MD2.5 / MD2.5H	41.00	15.70	15.00	Ø8h6
MD5 / MD5H	49.00	21.20	18.40	Ø8h6

LE Linear Encoders dimensions (mm)

IP50 versions



LE/12/S

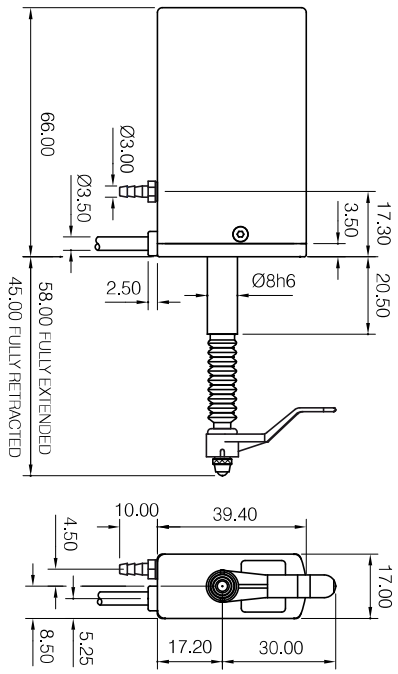


LE/25/S

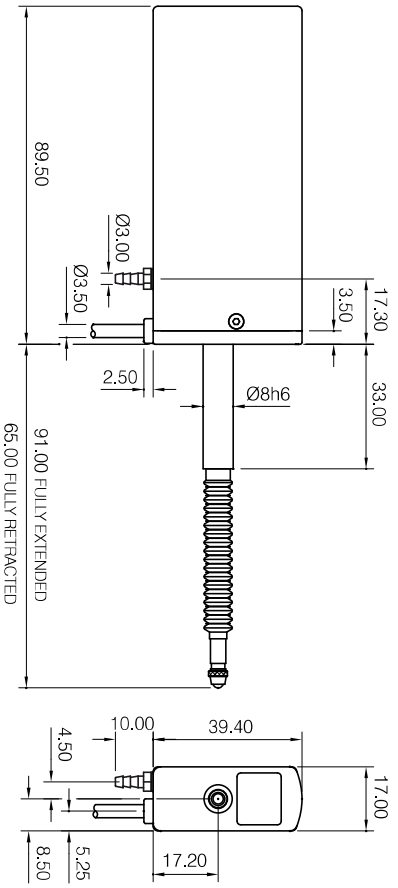
IP60 versions

Air inlet nozzle for pneumatic (P) versions

Lift for spring (S) versions



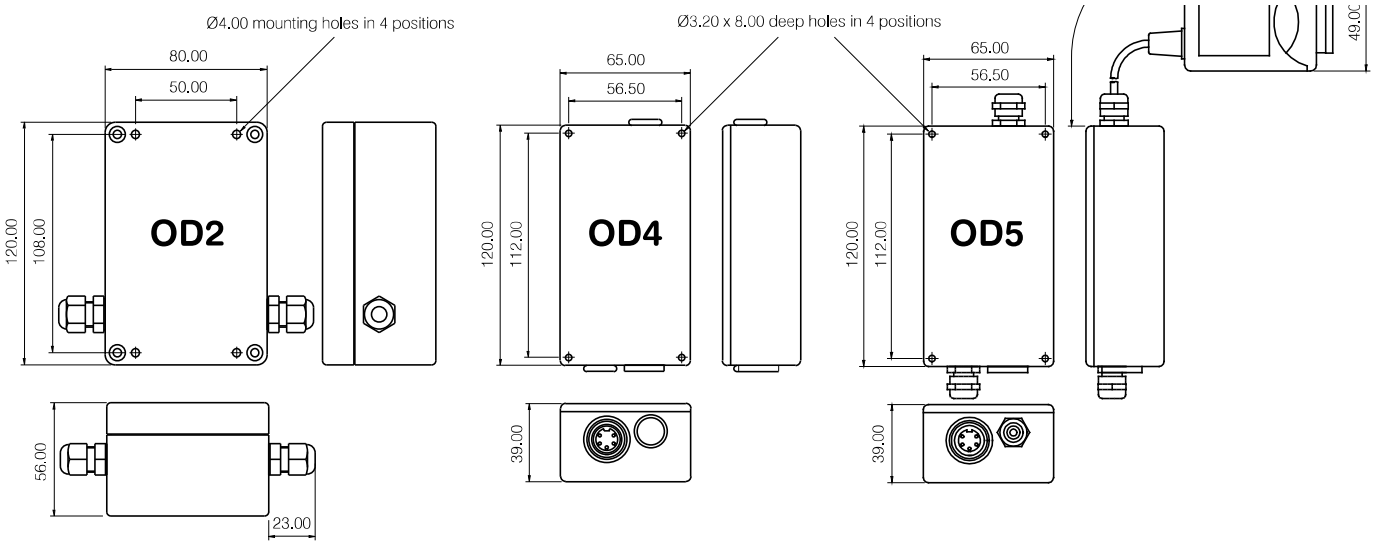
LE/12/S and LE/12/P



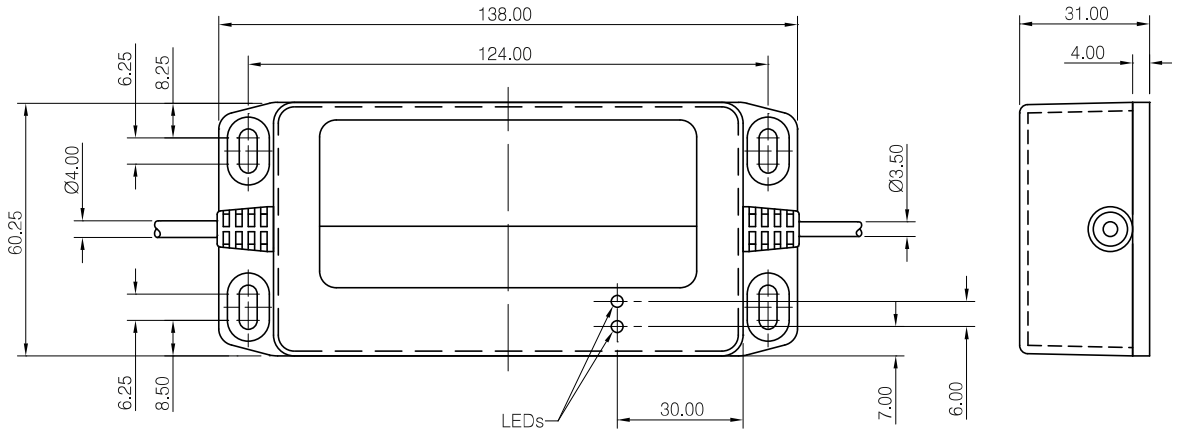
LE/25/S and LE/25/P

Signal conditioning modules dimensions (mm)

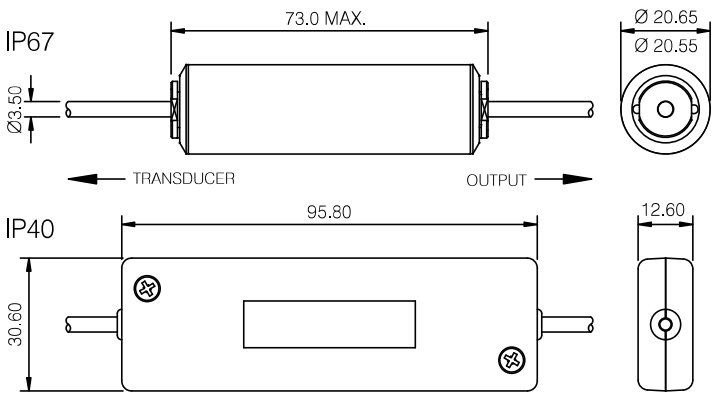
OD series



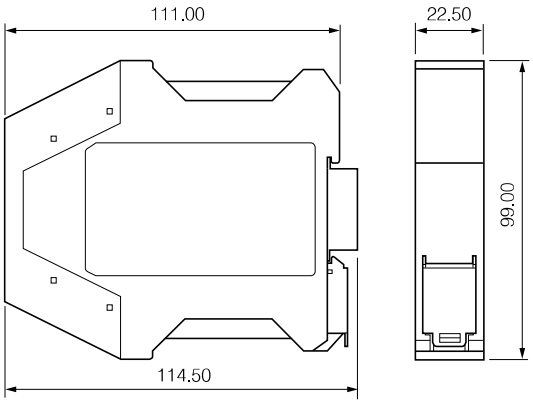
ATM TTL converter



BICM in line module

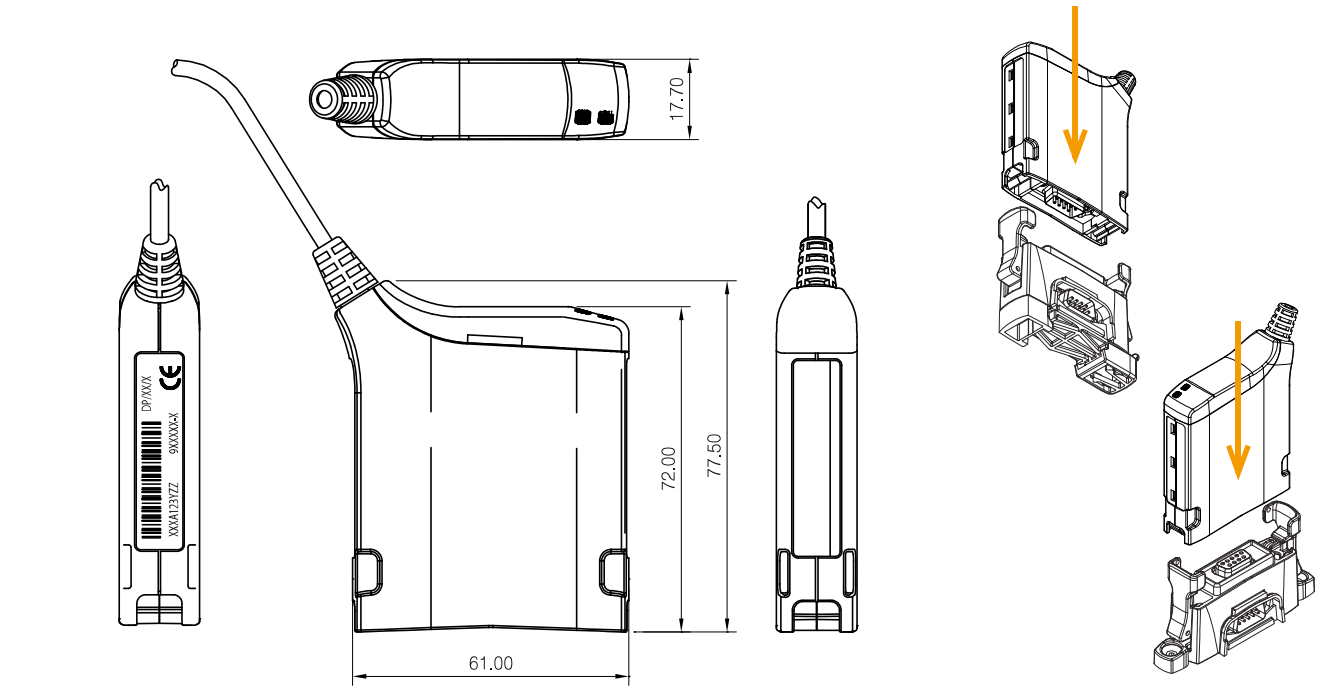


DRC DIN rail module

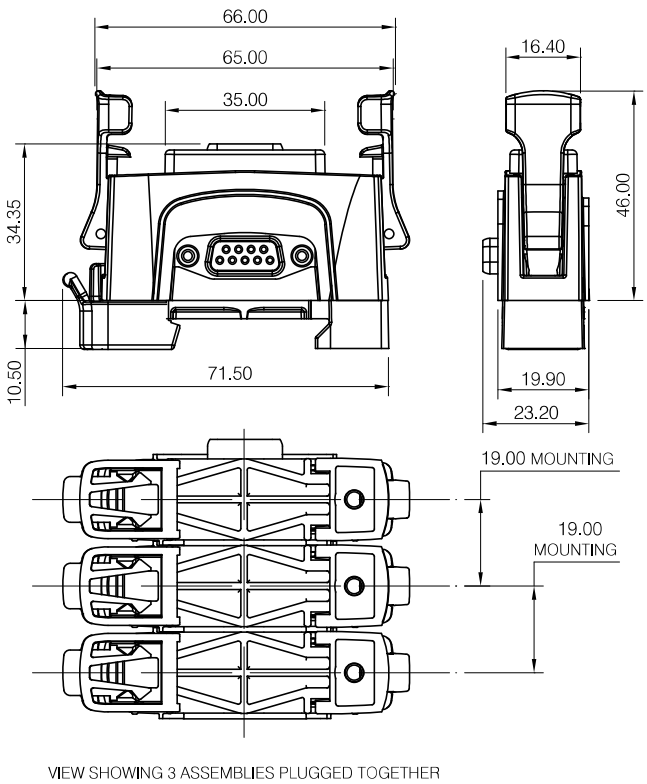


Orbit® interface components dimensions (mm)

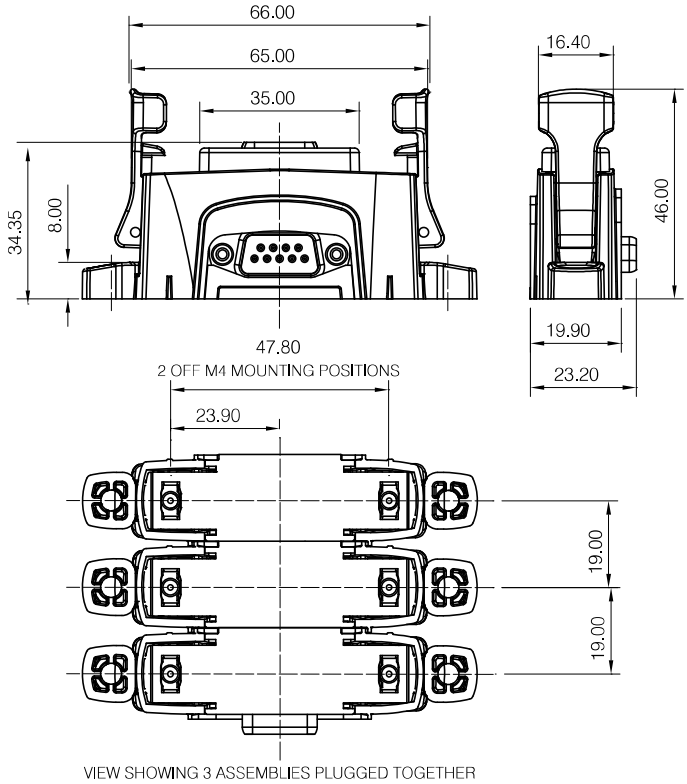
PIE (Probe Interface Electronics)



T-CON Orbit network connector



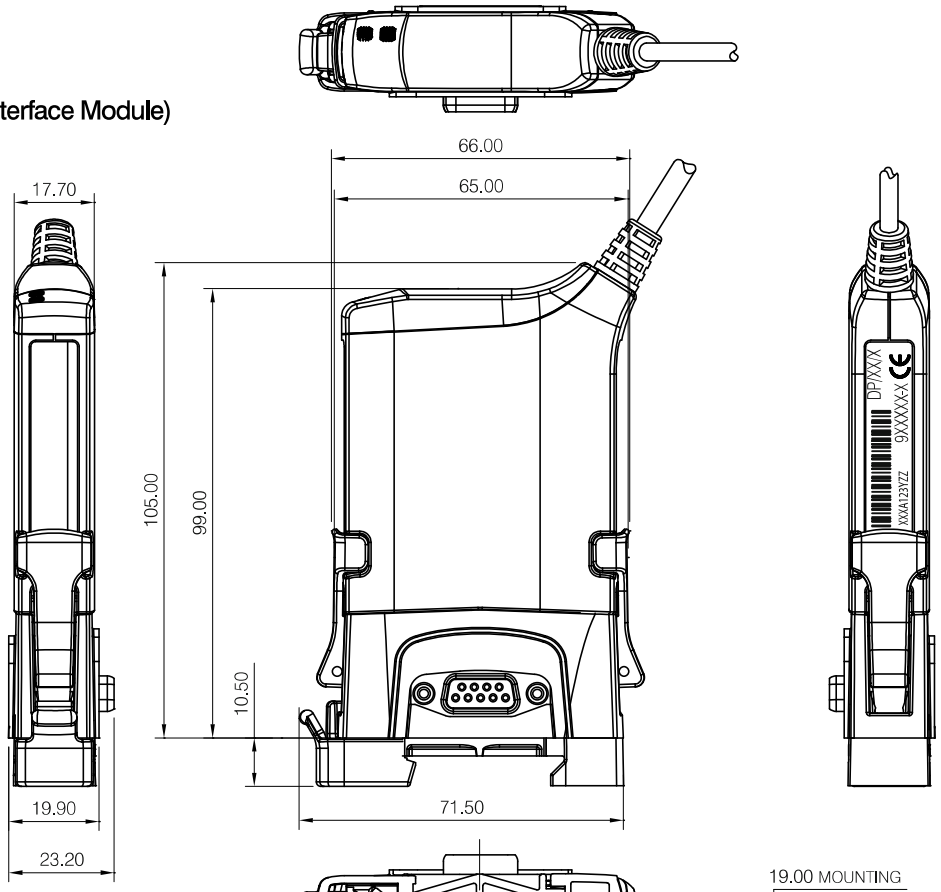
T-CON with 32 mm DIN raise connector

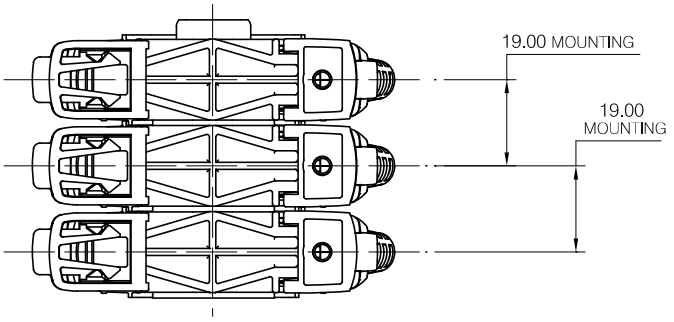


T-CON with mounting feet option

Orbit® interface components dimensions (mm)

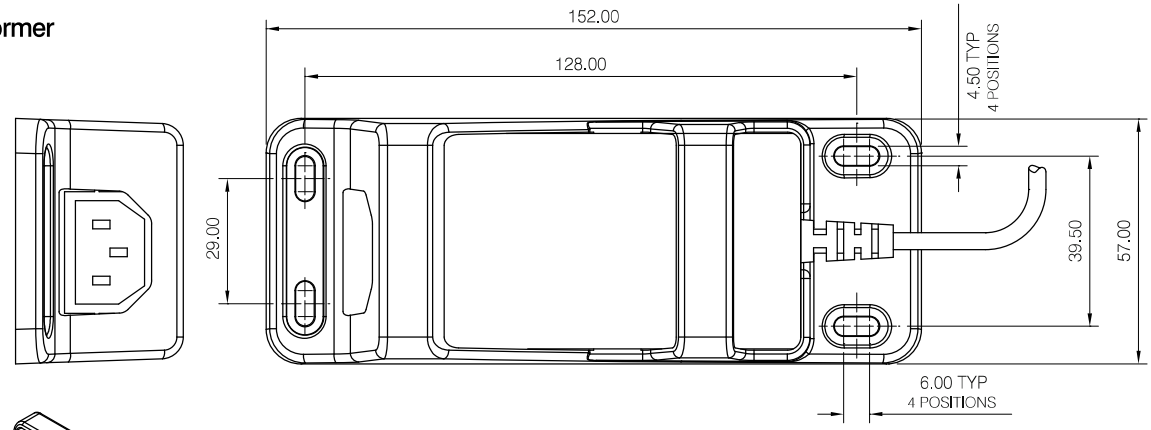
PSIM (Power Supply Interface Module)

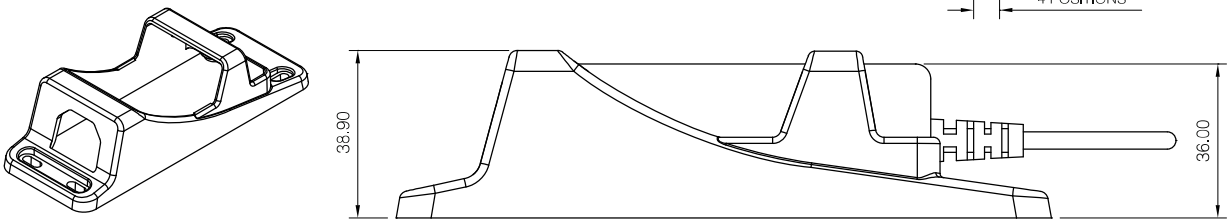




VIEW SHOWING 3 ASSEMBLIES PLUGGED TOGETHER

PSIM transformer





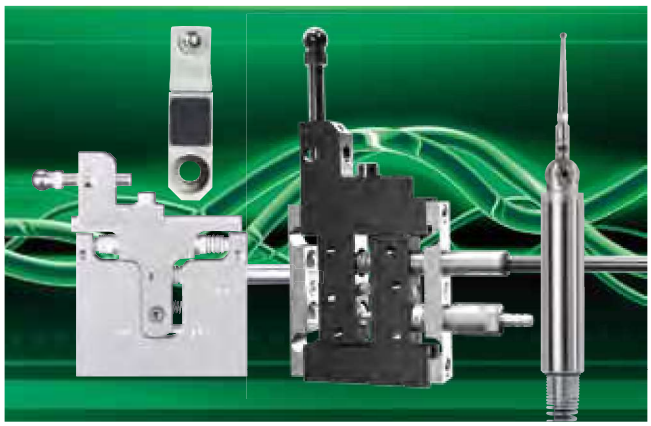
3D VIEW OF MOUNTING BRACKET

Other Solartron sensor solutions

Gauging Sensors

Our Specialist Gauges make precision measurements of miniature parts,bores and cavities a simple and reliable process.

- Measurement ranges from 0.5mm to 10mm
- Resolution down to 0.01μm
- Repeatability: <0.25μm
- IP65 protection
- LVDT and half bridge
- Pneumatic or spring actuation
- Range of changeable tips



Specialist Gauging Sensors

Our extensive range includes Inductive and Optical Encoder Probes and probes with integrated electronics.

- Measurement ranges from 0.5mm to 100mm
- Accuracy to 0.1% of reading (inductive) or 0.4μm for encoders
- Resolution down to 0.01μm or better
- Probe diameters from 6mm
- LVDT or Half Bridge
- Spring push, Pneumatic push or Vacuum retract
- Precision linear bearings

GEMCO Series Magnetostrictive Displacement Sensors

S953

- 25.4 mm to 7620 mm measuring range
- <0.01% linearity
- Vibration resistant up to 30G
- Shock Resistant up to 1000G
- Tricolour diagnostic LED
- All standard current and voltage outputs
- RS, VP, CP and TP Digital outputs
- IP 68
- Protective housings for harsh environments

The S953 VMAX Linear Displacement Transducer is the ideal solution for automation solutions requiring accurate feedback of continuous position. It is especially recommended in environments where vibrations, extreme temperature and contaminants are present. The S953 is an ideal solution when velocity and position need to be incorporated into the automation control system process.

S955

- 100 mm to 4572 mm measuring range
- <0.05% linearity
- Non-contact applications
- Analogue voltage and current outputs
- Analogue zero and span adjustable
- Digital RS, VP and CP outputs
- Quadrature outputs
- Tricolour diagnostic LED
- IP 67 (IP 68 optional)

Designed for OEMs as an alternative to limit switches, proximity sensors or linear potentiometers, the S955 Brik Linear Displacement Transducer is an economical solution for monitoring continuous position. The sensing element and electronics are housed in a streamlined anodized aluminium extrusion. Position is determined by a magnet, linearly guided over the sensing element.

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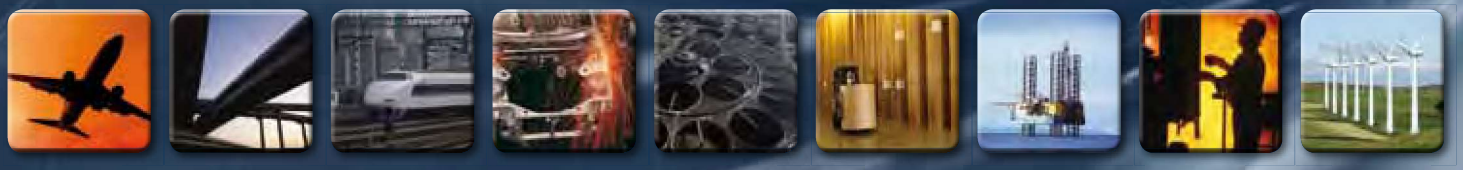

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