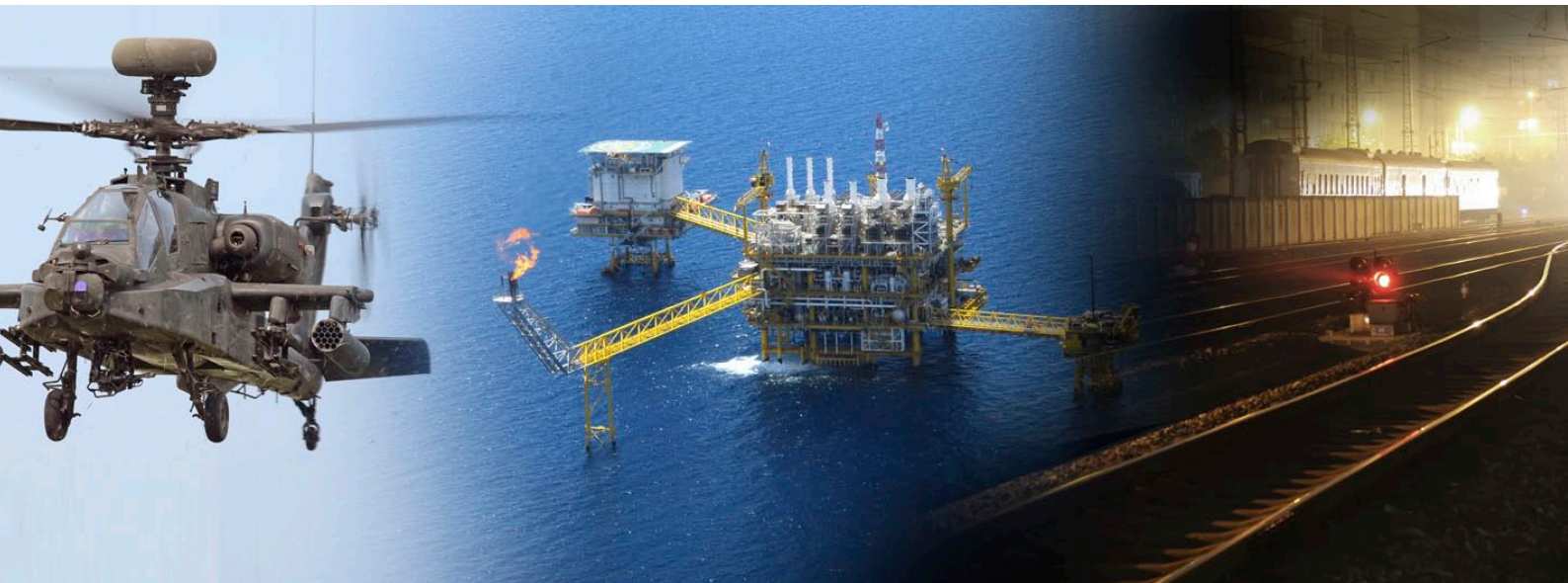




Sherborne **Sensors**

.... the first choice in precision



Sherborne Sensors is an ISO9001 and AS9100 certified global leader in the design, development, manufacture and supply of high precision inclinometers, accelerometers, force transducers, load cells, instrumentation and accessories for military, aerospace and industrial customers.



Company Overview



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The Company maintains a manufacturing and sales office in the UK, and a sales and stocking facility in North America, with representation globally. The core technologies used in our products were developed by the Schaevitz® and Maywood companies, and have been continually improved upon to expand the capabilities of each sensor product.

The ongoing acquisition of synergistic technologies by Sherborne Sensors within its inclinometer, force and accelerometer offerings has allowed customers to benefit from expanded product lines, with the added advantage of engineering support, global sales presence, repair, refurbishment and calibration services, stocking programs and continuous product improvement.

The potential range of applications for Sherborne Sensors' product portfolio is substantial, and continually increasing. Applications span sectors ranging from military and civil aviation to civil engineering (road, rail and tunnels), pipeline laying, satellite communications, UAV's, robotics, wire bond testing, oil platforms, transit systems and more.

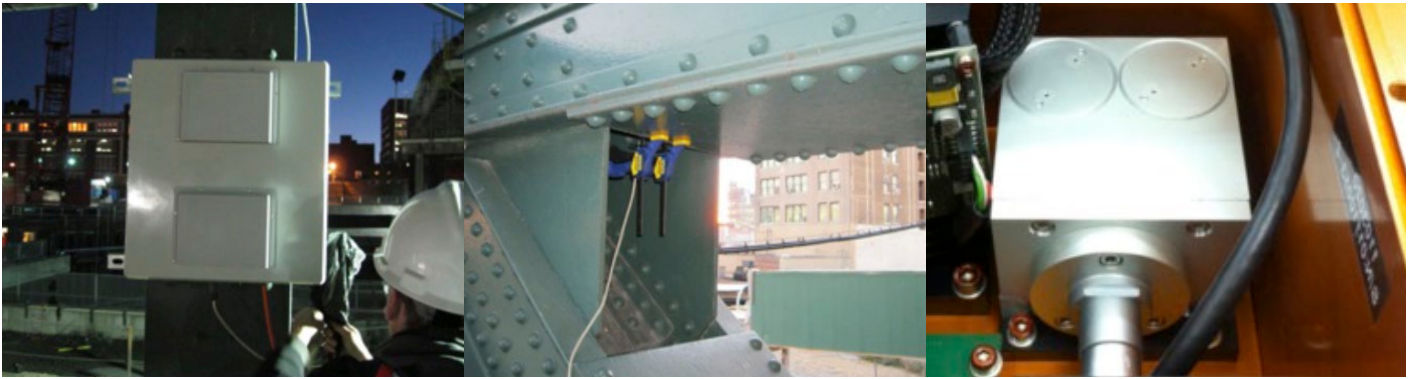
Ultimate Capabilities

- Rugged electronic inclinometers with precision accuracy down to 0.1 arc seconds
- Highly accurate servo accelerometers from ± 0.1 to $\pm 20g$, with custom solutions to several hundred g
- Small form factor MEMS accelerometers to 500g
- Force transducers from 10g to greater than 1300 tons



Market overview

Spotlight on MEMS



Sensors are an integral component of any measurement and automation application to ensure accuracy, reliability, efficiency and communications capability. This has fueled research and development in the sensors industry, and the continued innovation in sensors technology has ensured a thriving market and a growing demand for both COTS and custom solutions.

Sensors that perform with maximum reliability and long-life precision, such as inclinometers, accelerometers and load cells from Sherborne Sensors, enjoy an unrivalled status within the sensors industry and are critical for use in industries spanning aerospace, military and defense, rail, marine, construction and civil engineering, to name but a few. Sherborne Sensors continues to be a valued supplier to many of the leading names in these industries globally.








MEMS devices have come into the spotlight in recent years with wide-scale adoption in the automotive and consumer electronics industries. The use of MEMS sensors has also proliferated into all of the markets and applications served by Sherborne Sensors. Many of these require operational metrics that challenge the current performance and integration capabilities in the sensor manufacturing community.

Sherborne Sensors is uniquely positioned to design and supply both conventional and advanced MEMS based sensor solutions for our customers. Our existing product line is constantly being updated to incorporate additional functionality and improve performance. In addition, we have an active new product development pipeline that will continue to deliver state of the art products for the sensor end user community. Through our customization program, both conventional and MEMS based products can be tailored with exactly the right combination of sensors and complimentary components to provide a completely integrated and factory calibrated solution. We work closely with our customers and partners to provide comprehensive assistance on the most appropriate solution required for their application using MEMS or conventional inertial and force sensor technologies.



High Precision Inclinometers

Inclinometers derived from technology originally developed by the Schaevitz Company are available with specifications to support very high accuracy and precision applications. Operational ranges vary from +/-1 degree to +/-90 degrees. A variety of form factors, connection styles, materials of construction, output formats, and application specific devices are available in single, dual, and tri-axial configurations, using both conventional servo mechanical and MEMS technologies. Certain products are now offered with total error band specifications. Typical applications include: Antenna Positioning; Munition Fire Control Systems; Rail Line Maintenance and Repair; Steel Casting; Wind Tunnels and Oil and Gas Drilling. Please contact our Applications Group for additional information and to discuss specific applications.


	LSOC/P	LSW	DSIC	WTS	T820	T935	T435L
							
Description	Servo Rugged Industry Standard	Servo Weatherproof Rugged	Digital Output Rugged Servo	Wireless Advanced MEMS Tilt System	Advanced MEMS 23mm Diameter	Servo Rugged Small Form Factor Voltage Output	Servo Rugged Small Form Factor mA Output
Range (°)	±1 to ±90	±3 to ±90	±5 to ±60	±60	±14.5 to ±60	±1 to ±90	±1 to ±90
Full Range Output	±5Vdc	±5Vdc	RS485 ASCII	Angle	±5Vdc or 0.5 to 4.5Vdc	±5Vdc	4 to 20mA
Supply Voltage (Vdc)	±12 to ±18	±12 to ±18	+9 to +18 or +18 to +36	Integral Battery	±12 to ±18 or +9 to +18	±12 to ±18	+24
Resolution	0.1 to 4.0 arc-second	0.2 to 4.0 arc-second	0.001°	0.003° to 0.006°	1.0 to 4.0 arc-second	0.1 to 4.0 arc-second	0.1 to 4.0 arc-second
Thermal Zero Shift (% FRO/°C)	0.003 - 0.05	0.003 - 0.03	Accuracy of 0.08 degrees or better across entire compensated temperature range	0.007	0.005 - 0.010	0.003 - 0.05	0.01 - 0.05
Thermal Sensitivity (% reading/°C)	0.006 - 0.04	0.006 - 0.03		0.007	0.006 - 0.010	0.006 - 0.05	0.01 - 0.05
Non-linearity (%FRO max)	0.02 - 0.05	0.02 - 0.05		0.05	0.07 - 0.12	0.02 - 0.08	0.05 - 0.10
-3dB Frequency (Hz)	10 to 55	15 to 55	20 Max	5	5	10 to 55	10 to 55
Operating Temperature Range (°C)	-18 to +70	-18 to +70	-40 to +80	-20 to +60	-18 to +70	-18 to +70	-18 to +70
Mechanical Shock Limit (g) half sine	1,500	1,000	1,000	1,000	1,000	1,500	1,500
Connection	Connector or solder pin	IP67 Weather-proof cable	Connector	Wireless	Connector or Solder Pin	Solder Pin	Solder Pin
Features	±5Vdc or 4-20mA output options fluid filled	Stainless steel housing sealed to IP67 fluid filled	Single or dual axis defined total error dynamic filter fluid filled	Remote on/off no communication license battery & display options	Dual axis stainless steel housing sealed to IP67 small diameter for confined spaces	Single or dual axis stainless steel housing fluid filled	Stainless steel housing fluid filled small form factor
Options	Mating connectors power supplies indicator displays	Power supplies indicator displays cable lengths	Mating connectors baseplate	Alkaline and rechargeable batteries display and base stations	Power supplies indicator displays cable lengths	Wire harnesses power supplies indicator displays	Wire harnesses power supplies indicator displays

"We have tried working with several other inclinometer manufacturers over the last few years, and could never find a company that cared to make the effort to truly understand our business, and the demands placed on us by our customers. Based on their initial proposal, we worked with Sherborne Sensors extensively to determine the most appropriate sensor for our application. Their sales and technical support were critical in providing us with the technology we needed to meet the performance requirements of our customers, and a stocking program that ensures we will meet our delivery milestones. I can't say enough about how pleased we are to have them as a valued supplier."

Rob Olenoski, Vice President, International Cybernetics Corporation.

Commercial / Industrial Inclinometers

Our commercial/industrial inclinometers are available to meet many application requirements where lower precision, accuracy and frequency response are desired. These devices are available in a wide variety of ranges, form factors and performance envelopes, using both servo mechanical and MEMS technologies. Typical applications include: Barge Loading/Unloading; Platform Leveling; Automotive Testing and Vehicle Attitude Monitoring. Please contact our Applications Group for additional information and to discuss specific applications.







	T700	LSI	AccuStar	DQG	APS
					
Description	Single or Dual Axis Advanced MEMS	Gravity Referenced	Capacitance Tilt Sensor	Dual Axis Tilt Sensor	Angle Protractor System
Range (°)	±30° to ±90°	±3 to ±90	±60	±25	±20, ±45 & 0-90
Full Range Output (Vdc)	±1	±5	mV, serial & digital options	0.5 to 4.5	Angle
Supply Voltage(Vdc)	+6.5 to +18	±12 to ±18	±12 or +9	+8 to +30	Integral Battery
Resolution	3 to 7 arc-seconds	0.2 to 4.0 arc-second	0.01°	0.01°	0.1°
Thermal Zero Shift (% FRO/°C)	0.03	0.003 - 0.03	0.008°/°C	0.004°/°C	0.01°/°C
Thermal Sensitivity (% reading/°C)	0.03%	0.006 - 0.03	0.1%	0.008%	0.1%
Non-linearity (%FRO max)	0.5	0.02 - 0.05	0.1 - monotonic	0.5	0.1 - monotonic
-3dB Frequency (Hz)	10	15 to 55	0.5	0.5	0.5
Operating Temperature Range (°C)	-25 to +85	-18 to +70	-30 to +65	-40 to + 85	-18 to +55
Mechanical Shock Limit (g) half sine	3,500	500	300	300	200
Connection	Cable	Solder Pin	Cable	Cable	Cable
Features	Aluminum housing integral cable small form factor	Servo with ±5Vdc output & 2 supply options	Robust lightweight construction with 4 output options	IP66 sealed housing microprocessor controlled linearized output	Battery powered self contained tilt system
Options	Characterized outputs indicator displays	Power supplies & indicator displays	Sealing to IP67	Indicator displays	Cable lengths

“Shipping up to 80 tunnel guidance systems annually, we started to experience a relatively low run-rate for the manufacture of our inclinometers. As a result, we looked to outsource the manufacturing to reduce the size of our target units, as well as the time and cost associated with calibration. Having evaluated a number of inclinometer products, we found that none were as technically sound or as accurate as Sherborne Sensors’ T233 series.”

Mick Lowe, Senior Project Engineer at Zed Tunnel Guidance

Accelerometers









Accelerometers derived from technology originally developed by the Schaevitz Company are available in ranges from +/- 0.1g up to several hundred g, with a focus on accuracy, reliability, frequency response, and repeatability across the product line. Both conventional servo mechanical and MEMS technologies are available in single, dual, and tri-axial configurations. Optional electronics, enclosures for multiple sensors, materials of construction and a range of IP ratings are available. Typical applications include: Flight Control; Structural Health Monitoring; Crash Recorders and Rail Car Motion Control. Please contact our Applications Group for additional information and to discuss specific applications.

	A215/220	A260	A320	A545	A640	A700
						
Description	Servo Force Balance Industry Standard	Servo Force Balance 28Vdc Flight Applications	Servo Rugged Ultra Low Range	Advanced MEMS mV Output	Advanced MEMS Voltage Output	Single or Dual Axis Advanced MEMS
Range (g)	±1 to ±20	±1 to ±20	±0.1 to ±2	±2 to ±200	±1 to ±20	±0.5 to ±5
Full Range Output (Vdc)	±5	±5	±5 or ±10	±15mV	± 5	±1 to ±2
Supply Voltage	±15Vdc	+16 to +32	±15	+5	+6 to +32	+6.5 to +18
Resolution (% FRO)	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005
Thermal Zero Shift (± % FRO/°C)	0.002	<0.002	0.005 to 0.03	<0.06	0.06 to 0.12	0.03
Thermal Sensitivity (± % FRO/°C)	0.02	0.02	0.006 to 0.03	0.06	0.06	0.03
Non-linearity (± %FRO max)	0.05 to 0.10	0.05 - 0.10	0.01 - 0.02	0.5	0.5	0.5
-3dB Frequency (Hz)	90 to 150	90 to 150	20 to 60	700 to 6,000	5 to 600	800
Operating Temperature Range (°C)	-55 to +95	-55 to +95	-18 to +70	-40 to +105	-40 to +100	-25 to +85
Mechanical Shock (g) half Sine	100	100	1,500	1,000	200	>3,500
Connection	Connector or Solder Pin	Connector	Connector or solder pin	Solder Pin	Connector or Solder Pin	Cable
Features	Miniature or standard form factor with 1g bias option	Single ended supply & 1g bias options aerospace applications	±5Vdc or 4-20mA output options fluid filled	Single, dual or tri-axial versions available	1g Bias option replacement for schaevitz A400 series	Aluminum housing integral cable small form factor
Options	Mating connectors power supplies indicator displays	Mating connectors indicator displays low pass filters	Mating connectors power supplies indicator displays	Indicator displays	Mating connectors indicator displays	Characterized outputs indicator displays

By incorporating Sherborne Sensors' custom linear servo accelerometer technology into their proprietary SHM data collection device, STRAAM's experts can say whether a structure transfers loads as designed. Michael Horodniceanu, president of New York City Metropolitan Transportation Authority Capital Construction, has tested the STRAAM service for both constant monitoring and structural analysis of fragile buildings. Notes Horodniceanu, "This is a great tool that will allow us to look at buildings differently. It takes a lot of the guesswork out of it," he says. "We are very excited about continuing to use this system."

Force Transducers

Force Transducers, many of which are derived from technology developed by the Maywood Company, are available in ranges from 30 grams to over 1500 tons. All products are high performance systems using advanced strain gauge technologies. Our force transducers exhibit excellent side load and bending moment compensation, high frequency response, a variety of materials of construction, and the ability to customize form factors and ranges to optimize results to meet specific requirements. Typical applications include: Payload Validation; Flight Test Labs; Suspended Loads; Pharmaceuticals/Tablet Manufacturing and Tank Weighing. Please contact our Applications Group for additional information and to discuss specific applications.

	SS2/3	SS4000M	SS5000	SS6000	U2000	U4000	VC7600	UNIWEIGH
								
Description	Miniature, ultra low force range	Miniature universal load cell	Miniature, high-level amplified output	Shear force, ideal for winding tension measurement	Miniature low profile, tension / compression	General purpose, tension / compression	Low profile, fatigue rated, high resistance to off axis loads	High accuracy load platforms, ultra low measurement ranges available
Operating Range	±30g or +60g	10N to 500N	250N to 2000N	2000kg to 5000 kg	1kN to 25kN	50N to 50kN	2kN to 1000kN	100g to 50 kgf
Operational Mode	Universal or Compression only	Universal	Universal	Shear Force	Universal	Universal	Universal	Compression
Recommended Excitation Voltage (VDC)	5	10	±10Vdc	10	10	10	10	20
Safe Overload Capacity (% range)	500	150	150	150	150	150	150	150
Full Range Output (mV/V)	12	±2		2	2	2.7	2	2 to 20
Non-linearity (%FRO)	-	0.05	0.25	0.03	-	-	-	-
Combined Error (%FRO)	0.5	-	-	-	0.25	0.03	0.07	0.03 to 0.05
Compensated Temperature Range (°C)	-10 to +65	-10 to +60	-25 to +75	-10 to +40	0 to +60	0 to +60	-20 to +80	-20 to +80
Thermal Zero Shift (± % FRO/°C)	≤ 0.02	≤ 0.01	≤ 0.02	≤ 0.0025	≤ 0.02	≤ 0.002	≤ 0.005	≤ 0.003 to 0.01
Thermal Sensitivity (± % Reading/°C)	≤ 0.02	≤ 0.002	≤ 0.02	≤ 0.005	≤ 0.005	≤ 0.002	≤ 0.005	≤ 0.003
Electrical Connection	Integral cable	Integral cable	Integral cable	Integral cable	Lemo connector	Integral cable	Bayonet lock connector	Integral cable
Environmental Protection	IP51	IP54	IP65	IP67	IP54	IP51	IP67	IP51
Features	Ultra low range high frequency response	35mm high excellent side load and bending moment compensation	High level amplified output stainless steel construction	Bearing mount enabled. Stainless steel construction	18 mm high excellent side load and bending moment compensation	High accuracy stainless steel construction 6 wire connection	stainless steel construction	Excellent side load and bending moment compensation Immune to eccentric loading
Options	-	Rod end bearing for tension applications	-	-	Mounting base spherical load button double bridge	Sealing to IP65 for ranges ≥500N	Mounting base thread custom range	-



Accessories

Sherborne Sensors offers a broad range of accessories and services to enhance the performance and capabilities of our sensor products, including:

- line voltage and battery enabled power supplies
- specialized mating connectors
- cable assemblies
- high performance digital displays and universal input indicators
- repair and calibration services for all brands of accelerometers, inclinometers and force transducers

Customization

With extensive in-house engineering capabilities, Sherborne Sensors offers not only a large range of standard sensors but also unique expertise in the design, development and manufacture of specialized sensors and systems that meet specific customer application and performance requirements. The need to customize our sensors to the specific requirements of an application to ensure they deliver improved safety and efficiency, with optimized cost and return-on-investment is often critical to project success. Using customer driven elements of sensor design, output and performance, Sherborne Sensors will tailor a device to meet almost any application. Major cost and performance benefits may be realized by specifying a customized sensor where performance and mechanical design are optimally matched to specific application demands.



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