

# measurement

SPECIALTIES™

*sensing your world...*



Embedded Sensing Technologies



Measurement Specialties knows how to support OEMs

*Our sensors often play mission critical roles within the end device in which they are embedded. Accordingly, our customers rely on MEAS sensors to operate accurately, every time. At MEAS, we place the highest emphasis on quality in terms of design standards, process control and customer feedback/integration and back up our products with an industry leading warranty.*

*MEAS maintains the highest quality certifications, including:*

**Quality Statements:**

- ◇ AS/EN 9100
- ◇ ATEX
- ◇ ATEX 949EC
- ◇ CE-MDD
- ◇ CMDR – Health Canada
- ◇ EN 13980
- ◇ ESA 266
- ◇ ESCC266E
- ◇ ESCC 400C
- ◇ FDA
- ◇ ISO 13485
- ◇ ISO 14001
- ◇ ISO 9001
- ◇ MID
- ◇ Measuring Instruments Directive 2004/22/EC annex D
- ◇ NASA Qualified
- ◇ NSF-61 Water Quality
- ◇ PART21G
- ◇ TS 16949

Measurement Specialties (MEAS) designs and manufactures sensors that measure pressure/force, position, flow, level, vibration, temperature, humidity, torque, water quality and fluid properties. Used as embedded devices by original equipment manufacturers (OEMs) or as stand alone sensors for test and measurement, our products are critical for feedback and control to enhance product functionality, efficiency and safety. We are the heart of many everyday products and provide a vital link to the physical world.

MEAS is an applications company and understands that embedded often means custom. Our portfolio includes technologies capable of measuring most physical characteristics and allows us to design the right sensor for the right application, including multi-parameter sensors. Physical property, electrical input/output and packaged configuration are all considerations when developing products that meet our customers' needs.

We have expanded our technology portfolio and geographic reach, in part through the acquisition of strategically complementary companies. Our operations in the US, Europe and China provide resources close to our customers. This global footprint allows us to offer the lowest cost of ownership to OEMs.

Our business is understanding your sensing needs and developing solutions that meet your performance and cost objectives. At MEAS, we are Sensing Your World.

**About the Cover:** Several technologically exciting products are featured. From top to bottom are the Trican pressure, temperature and relative humidity sensor--our industrial fluid/fuel properties sensor--Manta water quality multiprobe--SG series string pot for mobile construction equipment --M7100 stainless steel, hermetic pressure sensor for HVAC and rugged environments--the 3801A accelerometer for HUMS applications--a robust temperature sensor--LS309-21 sensor for low fuel level--front/back view of a 24-bit altimeter--16 channel pressure scanner for wind tunnel research--our patented Piezo Film used in tamper, traffic and dynamic measurement applications--and ultrasonic sensor for bubble detection.



## Industries Served



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## Sensor Types



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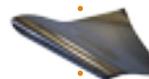
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ing Technologies

### Auto Braking System

Pressure sensors are used in Electronic Stability Control systems to detect and measure applied brake pedal pressure to distinguish between normal and emergency braking.



## Engine and

Measurement Specialties offers competitive programs for high volume automotive sensors using our TS 16949 certified facilities in France, Germany, Scotland and China. We understand the rigors and demands of on- and off-road vehicles used in the trucking, commercial vehicle, construction, agriculture, forestry and mining markets. Our sensors are manufactured to exacting specifications to tolerate the high temperature, vibration, shock, pressure and long life requirements for these working vehicles.

### Fluid Quality Monitoring

Fluid property sensors directly monitor the key characteristics of oils, fuels and urea. They detect harmful contaminants and fluid condition in order to improve vehicle up-time and performance. Urea concentration and quality monitoring support proper operation of urea SCR systems to insure NOx emissions compliance.



### Temperature Monitoring

Stand alone or combined with other sensors, Measurement Specialties offers the largest range of temperature probes based on NTC, RTD Platinum or Nickel and Thermopile.

### Engine Control

Humidity and temperature sensors are located at the air intake of internal combustion engines. The sensors are key components in systems designed to improve fuel efficiency and reduce emissions.

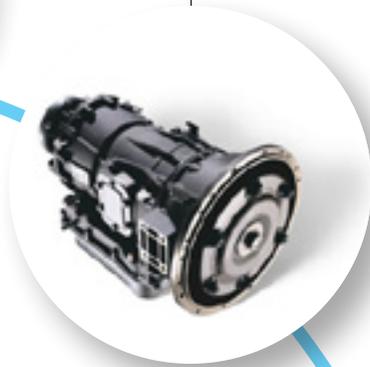


# Vehicle

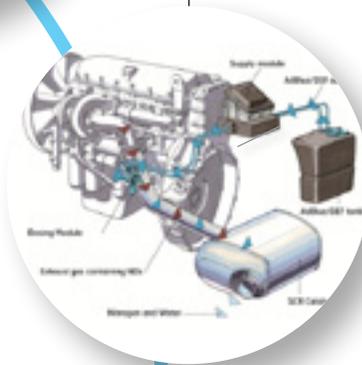
Sensors for Engine and Vehicle applications are RoHS compliant and are matched with applications to ensure appropriate ingress protection designed into every product. Signal outputs are provided with protection against EMI/RFI interference and cable interfacing specified to reduce risk of failure due to fatigue or accident. Selection of all materials of construction and fittings is made carefully to minimize installation and routine inspection costs.



**Electronic Braking**  
Tilt sensors measure inclination of vehicle and automatically apply parking brake.



**Oil and Fuel Levels**  
Stand alone or combined with temperature and/or fluid quality sensors, Measurement Specialties' level sensors are designed for off-highway, gear box, transmission and tank applications.



**SCR**  
SCR sensors measure the level, quality and temperature and as required provide heating of DEF tanks to help emission control.



**Fogging Prevention and Cabin Energy Control**  
Humidity and temperature sensors are used to prevent windshield fogging, critical for safety, cabin comfort and energy management.

**Off-Road Mobile Hydraulics Control**  
Linear position and pressure sensors used in hydraulic pumps, valves and actuators provide closed loop control and monitoring in electro-hydraulic systems, for such applications as excavators, vehicle lifts and cranes.

# Medical

Measurement Specialties has proven capabilities supplying to the OEM medical marketplace that include applications for life-sustaining, implantable medical devices. We are FDA registered for medical device manufacturing and ISO 13485 certified. We work closely with our customers to pioneer the use of sensor technology in medical equipment, devices and probes. This technology is used for the diagnosis or treatment of many pathologies including heart disease, high blood pressure, respiratory illness, renal failure and sleep apnea.

## Patient Monitoring

FDA-registered reusable and disposable temperature and pulse oximetry (SpO<sub>2</sub>) probes continuously monitor patient core body temperature, pulse and blood oxygen saturation. Pressure sensors provide continuous, intravenous blood pressure measurement while MEAS piezo sensing technology is used to measure breathing patterns and patient movement.



## Respiratory Devices

Temperature, humidity, pressure, position and flow sensors are used to provide precise feedback for inspired, expired and tank/wall-supplied gases in respiratory devices including sleep therapy (CPAP), oxygen concentrators and critical care and anesthesia ventilators. Our sensors improve patient comfort and device accuracy and reliability.



## Cardiovascular Devices

Temperature, pressure and vibration sensors are used for invasive cardiac monitoring, cardiac rhythm management, angioplasty and ventricular assist devices (VAD).



## Infusion and Syringe Pumps

Pressure, force, ultrasonic bubble and position sensors are used to detect occlusions, bubbles, medication bag voids and flow rates.



## Pulse Oximeter

Photo Optic sensors provide continuous, non-invasive measurements of blood oxygen saturation.

**Water Quality Data Collection**

Multiparameter water-quality multiprobes measure your choice of temperature, dissolved oxygen, conductivity, pH, turbidity and a dozen other parameters manually or unattended.



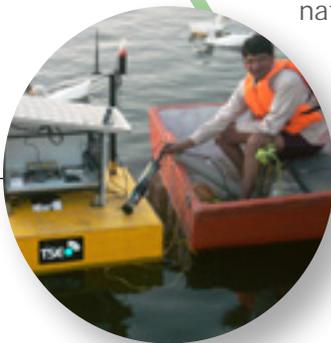
**Water Level Monitoring**

Level data loggers and digital submersible level transducers with SDI-12 output for highly accurate and precise water level measurements for water resource management.



# Environmental Monitoring

Measurement Specialties supports customers in the Environmental Monitoring markets; including government agencies, research institutions, academia, engineers and consultants, contractors, integrators, distributors and OEMs. Highly accurate and precise, rugged and reliable instruments meet the most demanding requirements for monitoring surface waters, groundwater, estuary and ocean waters and for managing drinking water, wastewater, storm water, landfill leachate, agricultural and hydropower systems. Our broad technology portfolio and easy-to-use products make us the supplier of choice for professionals responsible for monitoring natural waters or managing water processes.



**Data Telemetry**

Telemetry systems deliver real time water quality and/or water level data to your PC or smart phone.



**Water Level Transducers**

Analog submersible level transducers for water management applications, such as pump control, lift station operation, tank level monitoring, remediation and weir and flume measurement.

### Transport and Case Refrigeration Systems

Temperature sensors are used to measure air supply to control compartments while immersion probes measure refrigerant temperature. Rugged sensors designed specifically for measuring refrigerant pressure are used in conjunction with variable speed compressors to improve system efficiency.

### Industrial Paint Sprayer

Custom designed pressure sensor is used to monitor and precisely control the pressure in the paint canister to prevent splatter due to pressure pikes.

### Hot Water Boilers

Low cost temperature probes with fast response time and rugged brass housings provide accurate temperature measurements for industrial grade boiler systems.



## General OEM/Industry

Measurement Specialties supports OEM customers in many industries, including Industrial, Consumer and Commercial. Our engineered sensing solutions meet the unique requirements of a wide variety of applications within the building products, HVAC, refrigeration, energy, process control, automation, altitude and depth measurements and beverage flow control markets. Our broad technology portfolio and willingness to customize make us the sensor supplier of choice for industrial OEMs. From VAV/HVAC to process control, pool and spa to gas pumps, we understand the need for sensors designed to meet challenging OEM specifications.



### Traffic/Smart Highway

Piezoelectric axle detectors are used to collect data on highways, as well as providing the timing mechanism for speed and red light cameras.



### Wind Farm

Inclinometer is used to level wind turbines during construction and operation. Vibration sensors monitor the gearbox and provide early warning for maintenance.



### Gas Pump

Rugged electromagnetic rotary encoders provide tamper proof shaft rotation measurements which are converted into gallons or liters of fuel dispensed.



### Assembly Lines

Gage heads with ultra-precision capabilities and user-adjustable pretravel and overtravel settings ensure reliable assembly line performance.

### Navigation

Height measurement based on a miniature barometric pressure sensor enables route profile calculation and logging for outdoor devices. Difference in height measurements are used in automotive after-market GPS.



### Cycle Computers

Altimeters based on barometric pressure sensors enable measurement of route profiles and contribute to energy monitoring and fitness estimation.



### Sport Watches

Water depth for diving is accurately measured by gel-filled digital pressure sensors. Altimeter watches use barometric pressure variation for height measurement and longer trend pressure trends for weather prediction.



## Consumer Goods and Home Appliance

Sensors are being used in a variety of consumer and recreational products to bring enhanced functionality and safety. Measurement Specialties has partnered with many manufacturers to break new ground in offering features and user benefits. Those devices are often selected due to their low power consumption.

Sensors are increasingly being used by the home appliance industry to improve functionality and energy management. Measurement Specialties has partnered with many major appliance manufacturers to break new ground in the creation of "smart" appliances that can respond to human touch, sense vibration, adjust automatically to different loads and improve efficiency.

### Printers

The drying process of ink jet printers is improved by monitoring air and paper humidity content. Measuring air and toner humidity guarantees print quality in laser printers/copiers.



### Microwave Oven

Measurement Specialties' infrared temperature sensors monitor heating functions by directly sensing food temperature.



### Washer/Dryer

Low cost/low power vibration sensor measures load imbalance to avoid "walking". Humidity or thermopile sensors are used in dryers to automatically shut off when clothes are dry, extending the life of clothes and improving efficiency.



### Refrigerator

Humidity control inside refrigerator keeps vegetables fresh while humidity monitoring outside refrigerator improves efficiency by avoiding costly defrost cycles.

# Test and

## Flutter Testing

Silicon MEMS, Plug and Play accelerometers for high accuracy over temperature.



## Flight Testing

Aircraft manufacturers are constantly pushing the flight envelope of their designs to the new frontier. Unexpected test parameters become the norm rather than the exception, and standard off-the-shelf solutions are usually inadequate. These mission-critical test applications often require the best in DC accelerometers, load cells and miniature pressure transducers, especially when it comes to thermal stability. Measurement Specialties has partnered with many major aerospace suppliers to come up with customized sensing solutions.

## Scanners and Systems

Aerodynamic testing of aircraft, automobiles and civil engineering structures requires high numbers of pressure measurements, often within confined spaces inside wind tunnel models. The ESP line of miniature pressure scanners combines 16, 32 or 64 pressure sensors with a calibration valve within the industry's smallest package. Individual temperature sensors provide active digital temperature compensation to virtually eliminate thermal sensitivity.

## Turbo Machinery

Gas turbine engine and component testing requires high numbers of pressure and temperature measurements. The testing environment is often demanding with high vibration, acoustic noise and presence of harsh fluids. The NetScanner instrumentation brand provides a rugged, networkable system solution of multi-channel instruments to measure gas pressure, liquid pressure, temperatures and barometric pressure.



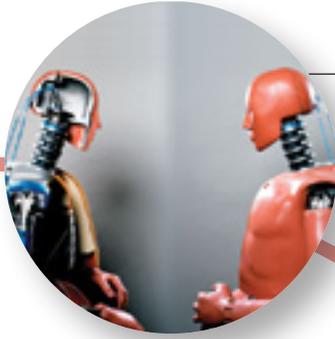
## Wind Tunnel

Miniature pressure sensors for airflow measurements.



## Turbo Machinery

Engine test cell measurements.



### Crash Testing

SAE J2570 and ISO-6487 compliant sensors for anthropomorphic instrumentation.

## Measurement

### Safety Testing

A five-star-rated vehicle can only be designed when the test engineers have accurate crash test data. Measurement Specialties is the largest sensor supplier for auto safety testing, supplying high quality accelerometers, string pots, miniature pressure sensors and other state-of-the-art technologies, we lead the way in product innovations and customer satisfaction.



### Pedestrian Safety Testing

Sensors with precise damping characteristic provide reliable measurements.

### Automotive Design & Test

From engine and transmission development to vehicle NVH testing, sensors are an integral part of the research and development cycle. Measurement Specialties provides the automotive industry with pressure transducers, load cells, accelerometers, LVDT's, torque meters, temperature sensors and fluid property analyzers for a wide variety of applications. The broad spectrum of sensing technologies available at our disposal has served our customers especially well in a cost-conscious economic environment.

### Motorsports

In auto racing, sensors provide real-time, critical feedback about vehicle dynamics to the engineering team that can often affect the outcome of a race. The high vibration and temperature test environments in an engine or drive train have always been challenging for typical sensing devices. Measurement Specialties has long been a favored supplier to Formula One teams for acceleration, pressure, force, position and other dynamic sensors. We offer the most advanced lines of accelerometers and pressure transducers and back them up with impeccable reliability records and customer service.



### Component Design/Road Simulation

Rugged IEPE Accelerometers for suspension testing. Standard off-the-shelf accelerometers, wheel torque sensors and brake/pedal force sensors.



### Racing Sensors

High accuracy silicon MEMS triaxial accelerometers for track mapping.



### Satellite/Space

Measurement Specialties is the only sensor company who maintains both NASA and ESA qualifications. We developed the interchangeable glass encapsulated thermistor which today is a standard for aerospace high reliability applications. MEAS LVDT's are used for mirror and antenna positioning.

**Engine Thrust Reverser**  
MEAS rugged LVDT's provide feedback to the cockpit to ensure thrust reversers have properly deployed.



### Load Path Monitoring

Force sensors for load monitoring on control surfaces and secondary load path. Torque transducers for brake system monitoring.



## Aerospace

Long development cycles and high qualification costs require aerospace firms to identify stable, reliable, cost-effective partners. Measurement Specialties' AS9100 certified facilities in Virginia, Ohio, France and China support various Tier 1, 2 and 3 providers with a wide variety of critical sensor solutions for aerospace applications.



### Fuel Tank Level/Flow

MEAS custom glass thermistor/ heater assemblies are an industry standard in fuel systems used to monitor and control fuel level, position and flow.



### Flight Controls/Instrumentation

MEAS LVDT's and RVDT's are used in cockpit controls and actuation systems. Flight recorders detect loss of cabin pressure. Pitot tubes measure air speed. Variometers indicate rate of ascent/descent. Force sensors convey information for flight data recording and autopilot disconnection.



### Gearbox Monitoring

MEAS high frequency accelerometers are used for critical Health and Usage Monitoring Systems (HUMS) for Helicopters.

**Trican**

Multi-parameter modules measure pressure, temperature and relative humidity for engine management applications.



**Force and Torque**

The multi-axial FN7325 measures force along three axes as well as the corresponding torque.



# Combination Sensors

Measurement Specialties is a global innovator in the design and manufacture of two or more sensing technologies into one compact package. Our combination sensors provide OEMs and end-users with significant cost savings that start with the initial purchase and flow through their respective systems, as they realize economies of time, reduced space requirements and simpler assembly processes.

**Pressure and Temperature**

Combined pressure and temperature sensing saves weight, space and reduces plumbing and electrical connections in various auto racing, aerospace and industrial applications.



**Fluid Properties Sensor**

Novel fluid properties sensor that directly and simultaneously measures the viscosity, density, dielectric constant and temperature of fluids for advanced fluid quality monitoring applications.



**Water Quality Multiprobes**

Water quality probes can utilize a wide range of measurement technologies for spot checking/ profiling or for deployment in real time web-to-water monitoring.



# Pressure

Measurement Specialties leads the industry with a wide array of standard and custom pressure products ranging from board level components to fully amplified and packaged transducers, based on piezoresistive microelectromechanical (MEMS) and silicon strain gauge (Microfused™) technology. Our products measure pressure ranging from inches of water (<5 mbar) to 60k psi (>4 kbar), making us ideally suited for medical, HVAC, off-road/heavy equipment and general industrial applications. We manufacture the world's lowest power and smallest package pressure sensors for altimeter/NAV applications. Our sensors are signal conditioned, calibrated over temperature and include digital or analog outputs. Customized packaging and electronics make MEAS the supplier of choice for OEMs.



## Silicon Die and Microstructures

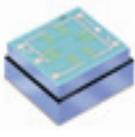
### For OEM Applications

All use piezoresistive silicon technology.



#### MS72xx

<b>Unique Features</b>	- Piezoresistive pressure die - Top cavity - hermetic sensor - For harsh environment
<b>Linearity</b>	±0.05% FSO (MS7212A)
<b>Output / Span</b>	150 mV @ 5 V
<b>Type</b>	Absolute
<b>Pressure Range</b>	0 - 1, 2, 4, 7, 12, 18, 28, 36 bar
<b>Overpressure</b>	FS range dependent 5 bar (MS7201-A2) 170 bar (MS7236-A)
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	1.35 x 1.79 (MS7201-A2) 1.95 x 1.63 (MS7236-A)
<b>Typical Apps</b>	Braking systems, transmission systems, engine controls



#### MS73xx

<b>Unique Features</b>	- Piezoresistive pressure die - Low pressure sensor - High sensitivity
<b>Linearity</b>	±0.3% FSO (MS7305)
<b>Output / Span</b>	110 mV @ 5 V
<b>Type</b>	Differential
<b>Pressure Range</b>	0 - 50 mbar (MS7305) 0 - 100 mbar (MS7310)
<b>Overpressure</b>	6 bar
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	2.45 x 2.45
<b>Typical Apps</b>	Heating ventilation and air conditioning, medical, industrial controls



#### P6393

<b>Unique Features</b>	- Piezoresistive pressure die - Silicon-pyrex construction - Open bridge
<b>Linearity</b>	±0.1% FSO
<b>Output / Span</b>	110 mV @ 1.5 mA
<b>Type</b>	Differential, absolute
<b>Pressure Range</b>	0 - 2, 5, 10, 15, 30, 50, 250, 500 psi
<b>Overpressure</b>	5X
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	3.0 x 4.0
<b>Typical Apps</b>	Process control, automation, refrigeration



#### P7405

<b>Unique Features</b>	- Piezoresistive pressure die for high pressure applications - Open bridge
<b>Linearity</b>	±0.25% FSO
<b>Output / Span</b>	125 mV @ 1.5 mA
<b>Type</b>	Absolute
<b>Pressure Range</b>	0 - 1000, 3000, 5000, 10000 psi
<b>Overpressure</b>	3X
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	1.80 x 1.80
<b>Typical Apps</b>	Can be packaged in an isolated oil-filled transmitter for harsh media

## Disposable Medical Products

### mV Outputs

All use piezoresistive silicon technology.



#### 1620, 1630

<b>Package</b>	Invasive blood pressure monitoring
<b>Type</b>	Gage
<b>Pressure Range</b>	-30 to 300 mmHg
<b>Output / Span</b>	5 uV/V/mmHg
<b>Unique Features</b>	- Low cost, disposable design - Supplied in tape and reel - Compliant to AAMI spec
<b>Accuracy</b>	1.0% FSO
<b>Operating Temp</b>	10°C to 40°C
<b>Dimensions (mm)</b>	1620: 8.13 x 11.43 x 4.20 1630: 5.08 x 12.7 x 3.94
<b>Typical Apps</b>	Disposable blood pressure, surgical procedures, ICU, kidney dialysis machines, medical instrumentation



#### Fully Assembled 1620 (Customized per customer specification)

<b>Package</b>	Invasive blood pressure monitoring
<b>Type</b>	Gage
<b>Pressure Range</b>	-30 to 300 mmHg
<b>Output / Span</b>	5 uV/V/mmHg
<b>Unique Features</b>	- Low cost, disposable design - Compliant to AAMI spec - ISO13485 Certified - Custom designs available
<b>Accuracy</b>	1.0% FSO
<b>Operating Temp</b>	10°C to 40°C
<b>Dimensions (mm)</b>	42.8 x 30.3 x 19.0
<b>Typical Apps</b>	Disposable blood pressure, kidney dialysis machines, surgical procedures and intensive care units. Ready to use, fully assembled disposable sensor units with cable, connector, stop cock, flush device in a plastic housing.

## Board Mounted Pressure Sensors

### Board Level with mV Output

All use piezoresistive silicon die technology, are temperature compensated and are suitable for use with non-corrosive gases.



#### 1210, 1220, 1230, 1240

<b>Package</b>	8 pin DIL
<b>Type</b>	Gage, absolute, differential
<b>Pressure Range</b>	0 - 5 & 10" H <sub>2</sub> O 0 - 1, 2, 5, 15, 30, 50, 100 psi
<b>Output / Span</b>	50 mV and 100 mV typical
<b>Unique Features</b>	- Temperature compensated - High performance UltraStable™ die (1230, 1240) - Current excitation(1210, 1230) - Voltage excitation(1220, 1240)
<b>Accuracy</b>	±0.1% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	15.2 x 20.3
<b>Typical Apps</b>	Medical instruments, air flow measurement, HVAC, process control, factory automation, leak detection



#### MS4425, MS4426

<b>Package</b>	6 pin DIL
<b>Type</b>	Gage, absolute, differential
<b>Pressure Range</b>	0 - 1, 5, 15, 30, 50, 100, 150, 300 psi
<b>Output / Span</b>	60 mV, 90 mV, and 100 mV typical
<b>Unique Features</b>	- Temperature compensated - High performance UltraStable™ die - Voltage excitation
<b>Accuracy</b>	±0.1% Non-linearity
<b>Operating Temp</b>	-25°C to 85°C
<b>Dimensions (mm)</b>	15.2 x 13.7
<b>Typical Apps</b>	Drop-in for 6 pin industrial sensor for PCB mounted medical, HVAC

### Board Level with mV Output

All use piezoresistive silicon die technology and are suitable for use with non-corrosive gases.



#### 13, 23, 33, 43, 17, 27, 37, 47

<b>Package</b>	TO-8
<b>Type</b>	Gage, absolute, differential
<b>Pressure Range</b>	0 - 1, 2, 5, 10, 15, 30, 50, 100, 250 psi
<b>Output / Span</b>	100 mV typical
<b>Unique Features</b>	- Temperature compensated - High performance UltraStable™ die (17, 27, 37, 47) - Can gel fill for humid conditions
<b>Accuracy</b>	±0.1% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	Ø 11.4, height model dependent
<b>Typical Apps</b>	Medical instruments, air flow measurement, HVAC, process control, factory automation, leak detection

#### 50

<b>Package</b>	TO-5
<b>Type</b>	Absolute
<b>Pressure Range</b>	0 - 15, 30, 50, 100, 250, 500 psi
<b>Output / Span</b>	60 mV typical
<b>Unique Features</b>	- Low cost - Solid state reliability - Good for through hole - Can gel fill for humid conditions
<b>Accuracy</b>	±0.25% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	Ø 8.2 x 4.14
<b>Typical Apps</b>	Tire pressure sensor, consumer appliances, medical instruments, barometric pressure, altitude measurement

## Board Mounted Pressure Sensors

### Miniature Board Level with mV Output

All use piezoresistive silicon die technology and are suitable for use with non-corrosive gases.



#### MS1451, MS1471

<b>Package</b>	Surface mount
<b>Type</b>	Gage, absolute
<b>Pressure Range</b>	0 - 5, 15, 30, 50, 100, 250, 500 psi
<b>Output / Span</b>	60 mV typical
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Coarse calibrated at room temp (MS1471)</li> <li>- With gel to protect against moisture</li> <li>- Tube or hole</li> </ul>
<b>Accuracy</b>	±0.25% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	7.6 x 7.6, height model dependent
<b>Typical Apps</b>	Altitude measurement, barometric pressure, medical instrumentation, consumer appliances, tire pressure



#### MS52xx, MS54xx

<b>Package</b>	Surface mount
<b>Type</b>	Gage, absolute
<b>Pressure Range</b>	0 - 1, 12 bar (MS52xx) 0 - 1, 7, 12 bar (MS54xx)
<b>Output / Span</b>	150 mV, 240 mV
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Small size (MS54xx)</li> <li>- High linearity or high sensitivity options</li> <li>- Plastic tube or metal ring options</li> <li>- With gel to protect against moisture</li> </ul>
<b>Accuracy</b>	±0.05% or ±0.2% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C
<b>Dimensions (mm)</b>	7.6 x 7.6, height model dependent (MS52xx) 6.4 x 6.2 (MS54xx)
<b>Typical Apps</b>	Absolute pressure sensor systems, engine controls, high resolution altimeters, variometers, waterproof watches, divers' computers, barometers, tire pressure monitoring systems (TPMS), medical instrumentation, pneumatic controls

### Board Level Digital Output Modules



#### MS58xx

<b>Unique Features</b>	24-bit digital sensor, software calibration and temperature compensation (I <sup>2</sup> C & SPI), no external components. Supply voltage 1.8 to 3.6V.
<b>Linearity / Absolute Accuracy</b>	±1.5 mbar @ 25°C (MS5803-01BA) ±250 mbar @ 0°C to 40°C (MS5803-30BA)
<b>Output / Span</b>	Digital 24-bit SPI and I <sup>2</sup> C
<b>Resolution</b>	12 µbar (MS5803-01BA) 0.5 mbar (MS5803-30BA)
<b>Type</b>	Absolute
<b>Pressure Range</b>	1, 2, 5, 14, 30 bar
<b>Overpressure</b>	10 bar (for 1 & 2 bar modules) 30 bar (for 5 & 14 bar modules) 50 bar (for 30 bar modules)
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	6.4 x 6.2 x 2.9
<b>Typical Apps</b>	Precision altimeter, diving and multi-mode watches, in-building navigation, variometers / flight instruments



#### MS55xx

<b>Unique Features</b>	16-bit digital sensor, very low noise (±0.1 mbar), software calibration and temperature compensation, pressure and temperature measurement (35 ms / meas.). Low power, low voltage (2.2 to 3.6 V / < 4 / 0.1 µA). No external components required, small SMD ceramic carrier. Gel provides water protection.
<b>Linearity / Absolute Accuracy</b>	±1.5 mbar @ 25°C 750 to 1100 mbar (MS5534, MS5540) -25 to +20 mbar @ 0°C to 40°C 0 to 5 bar (MS5535, MS5541)
<b>Output / Span</b>	Digital 16-bit data word, 3-wire SPI-like serial interface
<b>Resolution</b>	0.1 mbar (MS5534, MS5540) 1.2 mbar (MS5535, MS5541)
<b>Type</b>	Absolute
<b>Pressure Range</b>	10 to 1100 mbar (MS5534, MS5540) 0 to 14 bar (MS5535, MS5541)
<b>Overpressure</b>	10 bar (for 1 bar modules) 30 bar (for 14 bar modules)
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	6.4 x 6.2 x 2.9
<b>Typical Apps</b>	Mobile altimeter, barometer systems, weather monitoring systems, adventure or multi-mode watches, GPS receivers, diving computers and divers' watches

# Board Mounted Pressure Sensors

## Board Level Digital Output Modules / Amplified High Level Output Modules



### MS5536-CPJU, MS5536-CNJU

- Unique Features**
- 16-bit differential digital sensor
  - Software calibration and temperature compensation
  - Pressure and temperature measurement (35 ms / meas.)
  - Low power, low voltage (2.2 to 3.6 V / 5µA)
  - No external components required
  - Small SMD ceramic carrier

**Options**

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**Linearity / Absolute Accuracy**

±2.5 mbar @ 10°C to 40°C  
 -100 to +700 mbar (MS5536CPJU)  
 ±2.5 mbar @ 10°C to 40°C (0.04psi)  
 -700 to +100 mbar (MS5536CNJU)

**Output / Span**

Digital 16-bit data word,  
 3-wire SPI-like serial interface

**Resolution**

0.1 mbar

**Type**

Gage

**Pressure Range**

-400 to 1000 mbar (-5.8 to 14.5 psi) (MS5536-CPJU)  
 -1000 to 400 mbar (-14.5 to 5.8 psi) (MS5536-CNJU)

**Overpressure**

10 bar

**Operating Temp**

-40°C to 85°C

**Dimensions (mm)**

13.4 x 10.16 x 10.6

**Typical Apps**

Medical application, blood pressure meter, HVAC application



### MS4515DO, MS4525DO MS4515HRD, MS4525HRD

- 14-bit digital sensor (MS4515 / 25DO)
- 24-bit digital sensor (MS4515 / 25HRD)
- Pressure and temperature measurement
- Single supply of 3.3 or 5.0Vdc (MS4515 / 25DO)
- Single supply of 1.8 or 3.6Vdc (MS4515 / 25HRD)
- Top, side barbed or manifold O-ring port
- J lead or thru hole pins
- Fast conversion up to 0.54ms (MS4515 / 25HRD)
- Ultra low power consumption (MS4515 / 25HRD)

Gel coat, low power (MS4515 / 25DO)

0.25% / 1% TEB

14-bit digital word SPI or I<sup>2</sup>C protocol (MS4515 / 25DO)  
 24-bit digital word SPI or I<sup>2</sup>C protocol (MS4515 / 25HRD)

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Gage, differential (MS4515DO, MS4515HRD)  
 Gage, absolute, differential, compound (MS4525DO, MS4525HRD)

0 - 2, 4, 5, 10, 20, 30" H<sub>2</sub>O (MS4515 / 25DO)  
 0 - 1, 5, 15, 30, 50, 150 psi (MS4515 / 25HRD)

10 psi (MS4515DO, MS4515HRD)  
 3X range (MS4525DO, MS4525HRD)

-25°C to 125°C

12.5 x 9.9

Medical instruments, air flow measurements, process control, leak detection



### MS4515, MS4525

- Ratiometric analog output sensor
- Single supply of either 3.3 or 5.0 Vdc
- Top, side barbed or manifold O-ring port
- J lead or thru hole pins

Gel coat

0.25% / 1% TEB

10% to 90% or 5% to 95% of supply

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Gage, differential (MS4515)  
 Gage, absolute, differential, compound (MS4525)

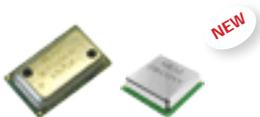
0 - 2, 4, 5, 10, 20, 30" H<sub>2</sub>O (MS4515)  
 0 - 1, 5, 15, 30, 50, 150 psi (MS4525)

10 psi (MS4515)  
 3X range (MS4525)

-25°C to 105°C

12.5 x 9.9

Medical instruments, air flow measurements, process control, leak detection



### MS56xx

- Unique Features**
- 24-bit digital sensor
  - Software calibration and temperature compensation (I<sup>2</sup>C & SPI)
  - Pressure and temperature measurement
  - No external components required

**Options**

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**Linearity / Absolute Accuracy**

±1.5 mbar @ 25°C (MS5607)

**Output / Span**

Digital 24-bit SPI and I<sup>2</sup>C (MS5607, MS5611)  
 Digital 24-bit I<sup>2</sup>C (MS5637)

**Resolution**

24 µbar (MS5607, MS5637)  
 12 µbar (MS5611)

**Type**

Absolute

**Pressure Range**

10 to 1200 mbar (MS5607, MS5611, MS5637)

**Overpressure**

10 bar (MS5607, MS5611)

**Operating Temp**

-40°C to 85°C

**Dimensions (mm)**

5 x 3 x 1 (MS5607, MS5611)  
 3 x 3 x 1 (MS5637)

**Typical Apps**

Smart phones, barometric compensation, air density compensation

## Stainless Steel Media-Isolated Pressure Sensors

### O-Ring Mount

All use UltraStable™ piezoresistive silicon die technology in a stainless steel package with oil-filled diaphragm and are suitable for use with liquids and gases. For other material, such as hastelloy, titanium etc, please contact factory.



**82, 154N**



**86**



**86A Amplified**



**DP86 O-Ring Mount**



**85 Flush Mount**

<b>Package</b>	3/4" (19 mm) diameter O-ring mount	5/8" (16 mm) diameter O-ring mount	5/8" (16 mm) diameter O-ring mount	5/8" (16 mm) diameter O-ring mount Wet/Wet	1/2" (13 mm) diameter O-ring flush mount
<b>Type</b>	Gage, absolute, vacuum gage	Gage, absolute, vacuum gage	Gage, absolute	Differential	Gage, absolute
<b>Pressure Range</b>	0 - 1, 5, 15, 30, 50, 100, 300, 500 psi	0 - 5, 15, 30, 50, 100, 300, 500 psi	0 - 1, 2, 5, 15, 30, 50, 100, 150 psi	0 - 1, 5, 15, 30, 50, 100, 300, 500 psi	0 - 15, 30, 50, 100, 300, 500 psi
<b>Output / Span</b>	100 mV typical	100 mV typical	0.5 - 4.5 Vdc	100 mV typical	100 mV typical
<b>Unique Features</b>	- High performance, high stability for OEM applications - Pressure as low as 1psi	- High performance, high stability for OEM applications - Small diameter	- Small diameter, amplified output - Bar ranges available	- Wet / wet differential pressure	- Minimizes trapped volume
<b>Accuracy</b>	±0.3% Non-linearity (1 psi) ±0.2% Non-linearity (5 psi) ±0.1% Non-linearity (≥ 15 psi)	±0.2% Non-linearity (5 psi) ±0.1% Non-linearity (≥ 15 psi)	±0.25% FSO	±0.3% Non-linearity (1 psi) ±0.25% Non-linearity (5 psi) ±0.1% Non-linearity (≥ 15 psi)	±0.1% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C	-40°C to 125°C	-20°C to 85°C	-20°C to 125°C	-20°C to 125°C
<b>Dimensions (mm)</b>	82: Ø 19 x 6.35 154N: Ø 19 x 13.72	Ø 15.9 x 9.14	Ø 15.9 x 9.3, height model dependent	Ø 15.9 x 17.8	Ø 17.2 x 11.43
<b>Typical Apps</b>	Process control, oceanography, refrigeration/ compressors, pressure transmitters, level systems	Hydraulic controls, process control, oceanography, refrigeration/ compressors, pressure transmitters, level systems	Level measurement, OEM transmitters and transducers, process control	Level controls, tank level measurement, corrosive fluids and gas measurement systems, flow measurement	Dialysis machines, infusion pumps, medical systems, pressure transmitters, level systems

### Threaded/Weldable

All use UltraStable™ piezoresistive silicon die technology in a stainless steel package with oil-filled diaphragm and are suitable for use with liquids and gases. For other material such as hastelloy, titanium etc, please contact factory.



**82, 85 with Fittings**



**89 Button, 89 with Fittings**



**DP86 with Fittings/Cable**



**U86B**

<b>Package</b>	Weldable or process fitting	Weldable or process fitting	5/8" (16 mm) diameter, threaded process fittings or O-ring mount	Mountable with O-ring seal
<b>Type</b>	Gage, absolute, vacuum gage	Sealed gage, absolute	Differential	Sealed gage, absolute
<b>Pressure Range</b>	0 - 5, 15, 30, 50, 100, 300, 500 psi	0 - 1000, 3000, 5000 psi	0 - 1, 5, 15, 30, 50, 100, 300, 500 psi	0 - 100, 300 psi
<b>Output / Span</b>	100 mV typical	100 mV typical	100 mV typical / sensitivity dependent	0.5 - 4.5 V
<b>Unique Features</b>	- Modular design	- High pressure, modular design	- Wet/Wet differential pressure - Line pressure max 1000 lbs	- Amplified
<b>Accuracy</b>	±0.2% Non-linearity (5 psi) ±0.1% Non-linearity (≥ 15 psi)	±0.25% Non-linearity	±0.3% Non-linearity (1 psi) ±0.25% Non-linearity (5 psi) ±0.1% Non-linearity (≥ 15 psi)	±0.5% Non-linearity
<b>Operating Temp</b>	-40°C to 125°C	-40°C to 125°C	-40°C to 125°C	-7°C to 105°C
<b>Dimensions (mm)</b>	82: Ø 22.23 x 24.89 85: Ø 22.23 x 25.15	89 Button: Ø 9.04 x 7.42 89 with Fittings: Ø 22.23 x 23.62	55.88 x 26.67 x 25.4	Ø 15.82 x 13.6 Socket spacing: 31.75
<b>Typical Apps</b>	Medical, process control, refrigeration compressor, oceanography, level systems	Air tank pressure, hydraulics, process control, robotics, refrigeration compressors, oceanography	Level controls, tank level measurement, corrosive fluids and gas measurement systems, flow measurement	Urea level, urea pressure, air brakes, corrosive fluid measurement for E&V applications

# Transducers and Transmitters

## Base Level and Custom Transducers and Transmitters

Microfused™ and UltraStable™ Technologies



### MSP100, MSP120

**Package** Small housing with O-ring and proprietary "Snap in" feature that lowers the total installed cost and customized housings for OEM applications

**Type** Gage

**Pressure Range** 0 - 100 psi thru 0-500 psi

**Output / Span** 100 mV typical

- Unique Features**
- Microfused™ Technology
  - Low cost stainless steel isolated transducer
  - No threads needed for pressure connect
  - Highly customized for OEM application
  - Small size
  - Solid state reliability

**Accuracy** 0.5% FSO

**Operating Temp** 0°C to 55°C

**Dimensions (mm)** 12.7 x 24.38 x 20.32

**Typical Apps** Beverage dispensing systems, automation, HVAC controls, energy and water management, pumps, compressors, pneumatic equipment

**Agency Approvals**



### MSP300, MSP340

**Package** Small housing with a large selection of threaded fittings, electrical connectors, cable options and customized housings for OEM applications

**Type** Gage

**Pressure Range** 0 - 50 psi thru 0 - 30K psi (MSP300)  
0 - 100 psi thru 0 - 30K psi (MSP340)

**Output / Span** 0 - 100 mV, 0.5 - 4.5 Vdc, 1 - 5 Vdc, 4 - 20 mA

- Unique Features**
- Microfused™ technology
  - High reliability at a low cost
  - Highly customized for OEM applications
  - Small size
  - Solid state reliability
  - Various total error band choices 1% thru 4.5% typical (all possible errors combined)

**Accuracy** <1% FSO

**Operating Temp** -20°C to 85°C

**Dimensions (mm)** MSP300: 22.23 x 22.23 x 55.88  
MSP340: 15.88 x 15.88 x 75.44

**Typical Apps** Paint sprayers, braking systems, HVAC controls, energy and water management, pumps, compressors, pneumatic equipment, off road heavy equipment, agriculture equipment

**Agency Approvals** UL 508 (MSP300)



### M5100, U5100, D5100

**Package** Industrial stainless steel housing with a large selection of threaded fittings, electrical connectors, cable options and customized housings for T&M applications

**Type** Gage (M5100)  
Gage, sealed gage, absolute (U5100)  
Differential wet-wet (D5100)

**Pressure Range** 0 - 50 psi thru 0 - 30K psi (M5100)  
0 - 1 psi thru 0 - 5K psi (U5100)  
0 - 1 psi thru 0 - 500 psi (D5100)

**Output / Span** 0.5 - 4.5 Vdc, 1 - 5 Vdc, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA

- Unique Features**
- Microfused™ technology (M5100)
  - UltraStable™ technology (U5100, D5100)
  - High performance at a low cost
  - Solid state reliability
  - 1% total error band ( -20°C to 85°C all possible errors combined) (M5100, D5100)
  - 0.75% total error band ( -20°C to 85°C all possible errors combined) (U5100)
  - Line pressure max 1000 lbs. (D5100)

**Accuracy** 0.25% FSO (M5100, D5100), 0.1% FSO (U5100)

**Operating Temp** -40°C to 125°C

**Dimensions (mm)** M5100: 22.23 x 22.23 x 80.77  
U5100: 22.23 x 22.23 x 98.04  
D5100: 25.4 x 58.4 x 72.0

**Typical Apps** HVAC controls, energy and water management, pumps, compressors, pneumatic equipment, off road heavy equipment, trucks, agriculture equipment, braking systems, filter blockage, pressurized tank level

**Agency Approvals** CE, UL 508



### US300

**Package** Small housing with a large selection of threaded fittings, electrical connectors, cable options and customized housings for OEM applications

**Type** Gage, absolute

**Pressure Range** 0 - 5 psi thru 0 - 5K psi

**Output / Span** 0 - 100 mV, 0.5 - 4.5 Vdc, 1 - 5 Vdc, 4 - 20 mA

- Unique Features**
- UltraStable™ technology
  - High reliability at a low cost
  - Highly customized for OEM applications
  - Small size
  - Solid state reliability
  - Various total error band choices 0.75% thru 3% typical (all possible errors combined)

**Accuracy** 0.15% FSO

**Operating Temp** -40°C to 105°C

**Dimensions (mm)** 15.88 x 115.88 x 98.00

**Typical Apps** HVAC controls, refrigeration, energy and water management, pumps, compressors, pneumatic equipment, agriculture equipment

**Agency Approvals**



### M7100, U7100

**Package** Automotive grade, stainless steel hermetic pressure ports and integral electrical connector

**Type** Gage, absolute

**Pressure Range** 0 - 15 psi thru 0 - 43K psi

**Output / Span** 0.5 - 4.5 Vdc

- Unique Features**
- 1% total error band ( -20°C to 85°C)
  - 2% total error band ( -20°C to 125°C)
  - Solid state reliability
  - Survives high vibration and immersion
  - Microfused™ technology (M7100)
  - UltraStable™ technology (U7100)

**Accuracy** 0.25% FSO (M7100), 0.5% FSO (U7100)

**Operating Temp** -40°C to 125°C

**Dimensions (mm)** 26.7 x 26.7 x 50.0

**Typical Apps** HVAC refrigeration controls, off road vehicles engine control, compressors, hydraulic, energy and water management

**Agency Approvals** CE



### US10000

**Package** Environmentally protected stainless steel housing with a large selection of threaded fittings, electrical connectors, cable options and customized housings for OEM applications

**Type** Gage, absolute

**Pressure Range** 0 - 5 psi thru 0 - 10K psi

**Output / Span** 0 - 5 V, 0 - 10 V, 4 - 20 mA

- Unique Features**
- UltraStable™ technology
  - High accuracy 0.05% (typical)
  - Digitally compensated
  - Pressure calibration standard
  - IP65 rated
  - 0.25% total error band from -25°C to 85°C

**Accuracy** 0.1% FSO (Max)

**Operating Temp** -25°C to 85°C

**Dimensions (mm)** 25.4 x 25.4 x 104.65

**Typical Apps** Aerospace testing, calibration, high end machinery, automotive, industry

## Transducers and Transmitters

### Miniature Pressure Transducers

### Sub-Miniature Pressure Transducers

	 <b>XPM</b>	 <b>EPXO</b>	 <b>EPXN</b>	 <b>EB, EPRB</b>	 <b>EPIH</b>	 <b>EPB, EPL</b>
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Dynamic and passive output</li> <li>- Miniature threaded</li> <li>- All titanium, flush diaphragm</li> <li>- Bonded silicon gage, high frequency response: (to 750 KHz)</li> <li>- Optional integrated amplifier</li> </ul>	<ul style="list-style-type: none"> <li>- Dynamic and passive output</li> <li>- High performance miniature threaded</li> <li>- Stainless steel flush diaphragm</li> <li>- Bonded foil gage, high frequency response (to 230 KHz)</li> </ul>	<ul style="list-style-type: none"> <li>- UltraStable™ long term stability</li> <li>- Miniature threaded</li> <li>- Recessed silicon diaphragm</li> </ul>	<ul style="list-style-type: none"> <li>- High accuracy</li> <li>- Miniature design</li> <li>- UltraStable™ technology</li> <li>- EMI protected</li> <li>- Combined pressure &amp; temperature</li> </ul>	<ul style="list-style-type: none"> <li>- Diffused silicon diaphragm with a large variety of sizes and shapes available as small as 0.05" outside diameter</li> <li>- High frequency response (to 1.7 MHz)</li> </ul>	<ul style="list-style-type: none"> <li>- Miniature flush mountable</li> <li>- Flush stainless steel diaphragm, flanged and / or non-flanged</li> <li>- Bonded silicon gage, high frequency response (to 400 KHz)</li> </ul>
<b>Non linearity</b>	±0.25% to ±0.5% FSO	±0.75% FSO	±0.3 to ±0.5% FSO	±0.25% FSO	±1.0% FSO	±0.5 to ±1% FSO
<b>Output / Span</b>	30 to 100 mV (4 V; 5 V optional)	9 mV or 5 Vdc	50 to 75 mV or 5 Vdc	0.5 to 4.5 Vdc	12 mV to 75 mV	10 mV to 125 mV
<b>Pressure Range</b>	0 - 15, 30, 75, 150, 300, 500, 750, 1.5K, 3K, 5K, 7.5K, 15K psi	0 - 150, 200, 300, 500, 1000, 1500, 2000, 3000, 5000, 7500 psi	0 - 5, 15, 30, 75, 150 psi	0 - 300, 500, 1000, 1500, 3000, 5000 psi	0 - 5, 10, 15, 25, 50, 75, 100, 200, 300 psi	0 - 5, 10, 15, 25, 50, 100, 250, 500, 1000, 2500, 5000 psi
<b>Overpressure</b>	2X	1.5X	3X	2X to 3X	2X to 5X	2X to 10X
<b>Operating Temp</b>	-40°C to 120°C (available option up to 150°C)	-40°C to 125°C (available option up to 220°C)	-40°C to 120°C	-40°C to 125°C (available option up to 150°C)	-40°C to 120°C	-40°C to 120°C
<b>Dimensions (mm)</b>	Hex 8 to Hex 15	Hex 15	15 outside dia.	11 body dia.	Application dependent	3.2 to 7 outside dia.
<b>Typical Apps</b>	Mil-aero, hydraulic pressure systems, air bag testing, air pressure systems, depth measurements, engine inlet and turbine, biomedical fluid sample analysis equipment	Hydraulic pressure systems, air or gas pressure systems, general purpose use in dry and wet media, off-road equipment	Long term stability applications for static pressure monitoring of dry media, satellites, atmospheric flight tests	Motor sport, hydraulic/pneumatic systems, automotive test stands, mil-aero test stands	Aerospace testing, wind tunnels, biomedical testing, aircraft body and wing dynamics, high frequency measurements	Air flow testing, hydraulic pressure systems, air pressure systems, bearing studies, ballistics, water hammer, miniature scale model testing

## Heavy-duty Industrial Transducers and Transmitters

	 <b>P900, P981, P1200, P700, P9000</b>	 <b>P101, P105, P125</b>	 <b>KPSI LT Transmitter Series</b>
<b>Package</b>	Threaded ports with stainless steel housing and various heavy duty electrical connections, various electrical outputs	Threaded port	Welded stainless steel watertight housing
<b>Type</b>	Gage, absolute	Gage	Gage, vented, absolute
<b>Pressure Range</b>	0 - 75 psi to 0 - 10K psi	0 - 10 bar to 0 - 7000 bar	Standard ranges from 0 - 1 psi to 0 - 500 psi. Custom ranges available.
<b>Output / Span</b>	0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA	7.5 to 15 mV (4 V; 5 V optional)	4 - 20 mA
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- High overpressure (10X over pressure)</li> <li>- Shock &amp; vibration resistant</li> <li>- Heavy Industrial grade transducer (P9000)</li> <li>- Advanced digital compensation / calibration</li> <li>- Mechanical over pressure stops</li> <li>- High temperature operation</li> </ul>	<ul style="list-style-type: none"> <li>- Stainless steel diaphragm</li> <li>- Pressure connector M20 x 1.5</li> <li>- Metal / metal seal</li> </ul>	<ul style="list-style-type: none"> <li>- Stainless steel with watertight cable</li> <li>- UltraStable™ technology</li> <li>- IP 68 submersible to 200 meters</li> <li>- For applications where flooding is problem</li> </ul>
<b>Accuracy</b>	0.1% to 0.2% FSO	±0.3% FSO	0.25% FSO
<b>Operating Temp</b>	-54°C to 120°C	-20°C to 80°C	-20°C to 60°C
<b>Dimensions (mm)</b>	Application dependent	Ø 29 x 85	Ø 25.4 x 170.5 (depending on fitting type)
<b>Typical Apps</b>	Steel mills, hydraulic controls, power generation equipment, torpedo depth, mil-aero, vehicle braking systems	Hostile environments, aggressive liquids	Submersible tank liquid level, pump control, liquid line pressure, dewatering, and construction bypass pumping
<b>Agency Approvals</b>	CE, CENELEC (Intrinsically Safe)		CE, WEEE, RoHS; with optional UL and FM (intrinsically safe) pending

Measurement Specialties leads the water-resources monitoring market with over thirty-five years of industry experience in the design and manufacture of water-quality and water-level sensors and systems. Our expertise in media-isolated pressure sensors provides our customers with unique advantages in creative product development and consistent product performance.

Water-level transducers are available in custom ranges and a wide choice of accuracies, materials, and cabling. With your choice of analog or digital output, our sensors are easily adapted to any data system. Or, use self-powered units with onboard memory for long term deployment.

We also provide multiparameter, water-quality instrumentation for the most demanding analyses of lakes, rivers, estuaries, and aquifers worldwide. Our multiprobes measure your choice of temperature, dissolved oxygen, conductivity, pH, water depth or level, ORP, turbidity, chlorophyll, crude oil, blue-green algae, ammonium, nitrate and a dozen other parameters critical to water-resources improvement and preservation. Call our water-quality specialists today to discuss our solutions to your monitoring problems.



# Manta2 Water Quality Multiprobes

NEW

Sensors for Multiprobes Are Customer-selectable and Easily Configured



Measurement Specialties' Manta2 line of water-quality multiprobes has a configuration to meet any demanding application. With your choice of 24 different sensors, they can be used as unattended water-quality data loggers with the optional battery pack, or with the rugged field display for spot checking/profiling. Connected to our Eagle Eye telemetry system they can be deployed for real-time water-to-web monitoring or to other data collection systems. Our water-quality specialists carefully review all monitoring applications prior to making equipment recommendations to ensure all customers receive exactly what is required for their projects.

	<p><b>Temperature</b></p> <p><b>Range</b> -5°C to 50°C</p> <p><b>Accuracy</b> ±0.1°C</p> <p><b>Resolution</b> 0.01°C</p> <p><b>Comments</b> Never needs calibration</p>	<p><b>Dissolved Oxygen (mg/L)</b></p> <p>0 to 25 mg/L</p> <p>1% of reading or 0.2 mg/L, whichever is greater</p> <p>0.01 mg/L</p> <p>Salinity corrected</p>	<p>25 to 50 mg/L</p> <p>±0.2 mg/L ≤20 mg/L</p> <p>±0.6 mg/L &gt;20 mg/L</p> <p>0.01 mg/L</p> <p>Salinity corrected</p>	<p><b>Conductivity</b></p> <p>0 to 100 mS/cm</p> <p>1% reading</p> <p>±1 count</p> <p>4 digits</p> <p>Automatic temperature compensated; graphite electrodes</p>
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<p><b>Salinity</b></p> <p><b>Range</b> 0 to 70 PSU (PPT)</p> <p><b>Accuracy</b> ±1% of reading or 0.1 PSU, whichever is greater</p> <p><b>Resolution</b> 4 digits</p> <p><b>Comments</b> Calculated from conductivity</p>	<p><b>TDS</b></p> <p>0 to 65 g/L</p> <p>±5% of reading</p> <p>4 digits</p> <p>Calculated from conductivity</p>	<p><b>Turbidity</b></p> <p>0 to 400 NTU</p> <p>±1% of reading</p> <p>±1 count</p> <p>4 digits</p> <p>ISO 7027</p>	<p>400 to 3000 NTU</p> <p>±2% of reading</p> <p>4 digits</p> <p>ISO 7027</p>
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<p><b>pH</b></p> <p><b>Range</b> 0 to 14 units</p> <p><b>Accuracy</b> ±0.2 units</p> <p><b>Resolution</b> 0.01 units</p> <p><b>Comments</b> Automatic temperature compensated</p>	<p><b>ORP</b></p> <p>- 999 to 999 mV</p> <p>±20 mV</p> <p>1 mV</p> <p>Platinum electrode</p>	<p><b>Depth</b></p> <p>0 to 10 m, 0 to 25 m, 0 to 50 m, 0 to 100 m, 0 to 200 m</p> <p>±0.1% Full Scale</p> <p>0.01 m</p>	<p><b>Level</b></p> <p>0 to 10 m</p> <p>0.003 m</p> <p>0.001 m</p> <p>Vented transducer; requires vented cable</p>	<p><b>Ammonium</b></p> <p>0 to 100 mg/L Nitrogen</p> <p>±10% of reading or 2 mg/L, whichever is greater</p> <p>0.1 mg/L - N</p> <p>Ion Selective Electrode with replaceable plasticized tips</p>
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<p><b>Nitrate</b></p> <p><b>Range</b> 0 to 100 mg/L Nitrogen</p> <p><b>Accuracy</b> ±10% of reading or 2 mg/L, whichever is greater</p> <p><b>Resolution</b> 4 digits</p> <p><b>Comments</b> Ion Selective Electrode with replaceable plasticized tips</p>	<p><b>Chloride</b></p> <p>0.5 to 18,000 mg/L</p> <p>±10% of reading or 2 mg/L, whichever is greater</p> <p>4 digits</p> <p>Ion Selective Electrode with replaceable plasticized tips</p>	<p><b>Chlorophyll a</b></p> <p>0.03 to 500 µg/L</p> <p>±3% of full scale</p> <p>0.01 µg/L</p> <p>Turner sensor</p>	<p><b>Rhodamine</b></p> <p>0.04 to 1000 ppb</p> <p>±3% of full scale</p> <p>0.01 ppb</p> <p>Turner sensor</p>	<p><b>Blue Green Algae</b></p> <p>150 to 300,000 cells/mL</p> <p>±3% of full scale</p> <p>10 cells/mL</p> <p>Fresh or marine available, turner sensor</p>
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# Water Resources Monitoring

**NEW**

## Level Data Loggers



### TruBlue 575 Baro

### TruBlue 585 CTD

## Digital Level Transducers



**NEW**

	TruBlue 555 Level	TruBlue 565 Level	TruBlue 575 Baro	TruBlue 585 CTD	KPSI 500	KPSI 501	KPSI 351	KPSI 353	KPSI 355
<b>Accuracy</b>	±0.1% FS TEB	±0.01 ft H <sub>2</sub> O	±0.1% FS TEB	1% of reading or 20 µs/cm	±0.05% FS TEB	±0.01 ft H <sub>2</sub> O	±0.01 ft H <sub>2</sub> O	±0.10% FS TEB	±0.05% FS TEB
<b>Range</b>	10 - 692 ft	10 - 50 ft	8 - 16 psia	5 - 200,000 µs/cm	10 - 230 ft	10 - 50 ft	10 - 50 ft	10 - 230 ft	10 - 230 ft
<b>Max Over-range</b>	2X FS	2X FS	32 psia	2X FS					
<b>Output</b>	RS-485	RS-485	RS-485	RS-485	SDI-12	SDI-12	SDI-12	SDI-12	SDI-12
<b>Data Logging Memory</b>	8 MB	8 MB	8 MB	8 MB	--	--	--	--	--
<b>Operating Temp</b>	0°C to 50°C	0°C to 50°C	0°C to 50°C	0°C to 50°C	-20°C to 60°C				
<b>Dimensions (mm)</b>	19 x 390	19 x 390	19 x 390	19 x 390	25.4 x 197	25.4 x 197	19 x 243	19 x 243	19 x 243
<b>Typical Apps</b>	Groundwater monitoring, surface water monitoring, oceanographic research	Groundwater monitoring, surface water monitoring, oceanographic research	Barometric pressure, atmospheric pressure	Groundwater monitoring, surface water monitoring, oceanographic research					

## Digital Temperature Transducers



**NEW**

	KPSI 380
<b>Accuracy</b>	±0.1°C
<b>Range</b>	-20°C to 60°C
<b>Max Over-range</b>	N/A
<b>Connection</b>	open port nosepiece
<b>Output</b>	SDI-12, RS-485
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	19.0 x 127.0
<b>Typical Apps</b>	Groundwater monitoring, surface water monitoring, storm water, dam operations, and stream gauging

## Telemetry Communication Systems



**NEW**

	TruBlue Remote Monitoring System Gateway
<b>Power</b>	7 - 28 Vdc (externally sourced)
<b>Environmental</b>	IP67
<b>Sensor Ports</b>	--
<b>Communication</b>	900MHz FHSS GPRS Cellular
<b>Supported Hardware</b>	RMS Nodes
<b>Typical Apps</b>	Monitoring of multiple level transducers within a given geographical area



**NEW**

	TruBlue Remote Monitoring System Node
<b>Power</b>	8 x Alkaline D-cell (internal)
<b>Environmental</b>	IP67
<b>Sensor Ports</b>	4
<b>Communication</b>	900MHz FHSS 802.11 b/g WiFi
<b>Supported Hardware</b>	MEAS TruBlue, 50x, 35x SDI-12 transducers
<b>Typical Apps</b>	Monitoring of multiple level transducers within a given geographical area

## Water Resources Monitoring

### Analog Level Transducers - 1" Bore



#### KPSI 700, 710, 720, 730, 735

<b>Level Accuracy</b>	±0.10%, ±0.05% FSO (KPSI 730, 735) ±0.25%, ±0.50%, ±1.00% FSO (KPSI 700, 710, 720)
<b>Range</b>	Custom ranges from: 5 - 700 ft H <sub>2</sub> O (vented, KPSI 730, 735) 35 - 700 ft H <sub>2</sub> O (sealed, KPSI 730, 735) 2.3 - 700 ft H <sub>2</sub> O (vented, KPSI 700, 710, 720) 10 - 700 ft H <sub>2</sub> O (sealed, KPSI 700, 710, 720) 35 - 700 ft H <sub>2</sub> O (absolute, KPSI 700, 710, 720)
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc, 0 - 2.5 Vdc, 0 - 4 Vdc, 0 - 10 Vdc, 1.5 - 7.5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	25.4 x 86.6
<b>Typical Apps</b>	Groundwater monitoring, surface water monitoring, oceanographic research, pump control, life stations, landfill leachate
<b>Agency Approvals</b>	CE, WEEE, RoHS; UL and FM (Intrinsically safe)



#### KPSI 705

<b>Level Accuracy</b>	±0.25% FSO
<b>Range</b>	Custom ranges from: 6 - 115 ft H <sub>2</sub> O
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc, 0 - 2.5 Vdc, 0 - 4 Vdc, 0 - 10 Vdc, 1.5 - 7.5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	104.1 x 279.4
<b>Typical Apps</b>	Wastewater, lift stations, tank level
<b>Agency Approvals</b>	CE, WEEE, RoHS; UL and FM (Intrinsically safe)



#### KPSI 750

<b>Level Accuracy</b>	±0.25% FSO
<b>Range</b>	Custom ranges from: 10 - 115 ft H <sub>2</sub> O
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc, 0 - 2.5 Vdc, 0 - 4 Vdc, 0 - 10 Vdc, 1.5 - 7.5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	104.1 x 279.4
<b>Typical Apps</b>	Wastewater, lift stations, tank level
<b>Agency Approvals</b>	CE, WEEE, RoHS; UL and FM (Intrinsically safe)



#### KPSI LTA

<b>Level Accuracy</b>	0.25% FSO
<b>Range</b>	Nine standard ranges from: 0 - 1 psi up to 0 - 500 psi. <b>Custom ranges available</b>
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	25.4 x 93.0
<b>Typical Apps</b>	Pump control, tank liquid level, landfill leachate monitoring, construction bypass pumping, dewatering
<b>Agency Approvals</b>	CE, WEEE, RoHS; with optional UL and FM (Intrinsically safe)



#### KPSI LTB

<b>Level Accuracy</b>	0.25% FSO
<b>Range</b>	Four standard ranges from: 0 - 11.5, 34.6, 69.2, 115.4 ft H <sub>2</sub> O. <b>Custom ranges available</b>
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	104.1 x 206.5
<b>Typical Apps</b>	Lift station monitoring, pump control
<b>Agency Approvals</b>	CE, WEEE, RoHS; with optional UL and FM (Intrinsically safe)

### Analog Level Transducers - 0.75" Bore



#### KPSI 320, 330, 335

<b>Level Accuracy</b>	±0.10%, ±0.05% FSO (KPSI 330, 335) ±0.25% FSO (KPSI 320)
<b>Range</b>	Custom ranges from: 5 - 700 ft H <sub>2</sub> O (vented, KPSI 330, 335) 35 - 700 ft H <sub>2</sub> O (sealed, KPSI 330, 335) 35 - 700 ft H <sub>2</sub> O (absolute, KPSI 330, 335) 5 - 700 ft H <sub>2</sub> O (vented, KPSI 320) 10 - 700 ft H <sub>2</sub> O (sealed, KPSI 320) 35 - 700 ft H <sub>2</sub> O (absolute, KPSI 320)
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc, 0 - 2.5 Vdc, 0 - 4 Vdc, 0 - 10 Vdc, 1.5 - 7.5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	19 x 151
<b>Typical Apps</b>	Groundwater monitoring, surface water monitoring, oceanographic research, pump control, life stations, landfill leachate
<b>Agency Approvals</b>	CE, WEEE, RoHS; UL and FM (Intrinsically safe)



#### KPSI 300DS

<b>Level Accuracy</b>	±0.50% FSO
<b>Range</b>	Custom ranges from: 700 - 4614 ft H <sub>2</sub> O
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc, 0 - 2.5 Vdc, 0 - 4 Vdc, 0 - 10 Vdc, 1.5 - 7.5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	19 x 215
<b>Typical Apps</b>	Down hole, level control, pump control
<b>Agency Approvals</b>	CE, WEEE, RoHS



#### KPSI 342

<b>Level Accuracy</b>	±0.25% FS TEB
<b>Range</b>	Custom ranges from: 2.3 - 700 ft H <sub>2</sub> O (vented) 10 - 700 ft H <sub>2</sub> O (sealed) 35 - 700 ft H <sub>2</sub> O (absolute)
<b>Max Over-range</b>	2X FS
<b>Output</b>	4 - 20 mA, 0 - 5 Vdc
<b>Operating Temp</b>	-20°C to 60°C
<b>Dimensions (mm)</b>	19 x 151
<b>Typical Apps</b>	Surface water monitoring, groundwater monitoring, tailrace and forebay monitoring
<b>Agency Approvals</b>	CE, WEEE, RoHS

Measurement Specialties is a pioneer in the design and manufacture of precision sensors for electro-mechanical flight control applications, test and measurement applications and ultra-low cost OEM load cells for high volume applications. We are experts in developing sensors that require high performance or unique packaging.

Based on our proprietary piezoresistive silicon strain gauge (Microfused™) technology our OEM load cells combine outstanding durability and long-term stability in extremely low cost packages, perfectly suited for medium and high volume applications.

Our flight-qualified sensors monitor secondary load path engagement and supply real time information from primary flight control forces to the Flight Data Recorder (Black Box). Other applications include force feedback for autopilot automatic disconnect function and flap jam detection systems.

MEAS' OEM and T&M load cells are tailored for specific customer applications including custom packaging and electronics with analog or digital outputs, suited for both low and high force environments.



## Load Cells

### Low Cost OEM



**FX1901-0001**

**Package** Low profile "coin cell" design

**Operating Mode** Compression

**Unique Features** - Ultra low cost, low strain design  
- Essentially unlimited cycle life

**Ranges (Lbf)** 10, 25, 50, 100

**Max Over-range** 2.5X

**Output / Span** 100 mV

**Combined** ±1.0% FSO

**Linearity & Hysteresis**

**Operating Temp** -40°C to 85°C

**Dimensions (mm)** Ø 25.00 x 29.50 x 8.00

**Typical Apps** Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



**FS20**

Miniature; drop in replacement for industry standard

Compression

- Load cell design operates at very low strains  
- Not subject to lead die fatigue

1.5, 3

10 lbf

1.0 to 4.0 V

±1.0% FSO

0°C to 70°C

30.708 x 17.272 x 8.255

Infusion pumps, contact sensing, medical devices, consumer appliances



**FC22**

Plastic housing, button, flange mounting

Compression

- Low cost button shape  
- Essentially unlimited cycle life

25, 50, 100

2.5X

100 mV, 0.5 to 4.5 Vdc

±1.0% FSO

-40°C to 85°C

Ø 26.00 x 42.00 x 19.50

Infusion pumps, robotics end-effectors, exercise machines, contact sensing, appliances



**FC23**

Stainless steel housing button shape for higher weight loads

Compression

- Industry standard low profile all stainless steel design  
- Resistant to off-axis loads.

250, 500, 1000, 2000

1.5X and 2.5X

100 mV

±1.0% FSO

-40°C to 85°C

Ø 31.75 x 10.20

Batch weighing, robotics, assembly line force, printing presses, pumps, winch and hoist

### Test and Measurement



**ELPF**

**Package** Dual stud

**Operating Mode** Tension and compression

**Unique Features** - Low cost  
- High immunity to off axis loads  
- Low deflection design for fast response and high cycle life  
- Optional external amplifier module  
- NIST traceable calibration provided

**Ranges N (Lbf)** 50 to 2.5K (10 to 500)

**Max Over-range** 2.5X F.S.

**Output / Span** 100 mV (0.5 - 4.5 V optional)

**Non-linearity** ±0.25% F.S.

**Hysteresis** ±0.25% F.S.

**Operating Temp** -40°C to 120°C (-40°F to 248°F)

**Dimensions (mm)** T1 Ø 19.00 x 25.40  
T2 Ø 25.40 x 29.10  
T3 Ø 25.40 x 33.16

**Typical Apps** Research, materials test, medical instrumentation, physical therapy, weighing, thrust, biomechanical measurements, product validation test



**ELFF**

Dual stud

Tension and compression

- Low cost  
- Optional high level output  
- Small, low profile design  
- Low deflection  
- NIST traceable calibration provided

50 to 500 (10 to 100)

2.5X F.S.

100 mV (0.5 - 4.5 V optional)

±0.5% F.S.

±0.5% F.S.

-40°C to 120°C (-40°F to 248°F)

B4 Ø 12.70 x 4.05  
T2 Ø 12.70 x 16.35  
T4 Ø 12.70 x 22.80

Robotics and effectors, dental and biomechanical parameter measurements, satellite and aerospace force feedback



**ELWF**

Through hole

Compression

- Low cost  
- Through-hole design  
- Low profile  
- Essentially unlimited life cycle  
- NIST traceable calibration provided

25 to 10K (5 to 2K)

1.5X to 2X F.S.

100 mV (0.5 - 4.5 V optional)

±5% F.S.

±1% F.S.

-40°C to 120°C (-40°F to 248°F)

B1 Ø 25.40 x 3.80  
B2 Ø 25.40 x 5.50  
D1 Ø 25.40 x 6.35  
D2 Ø 25.40 x 9.00  
D3 Ø 25.40 x 12.70

Bolt loads, thrust measurements, product validation test



**ELAF**

Button

Compression

- Low cost  
- Small, low profile design  
- Low off-axis response  
- Essentially unlimited life cycle  
- NIST traceable calibration provided

50 to 25K (10 to 5K)

2.5X F.S.

100 mV (0.5 - 4.5 V optional)

±0.25% F.S.

±0.25% F.S.

-40°C to 120°C (-40°F to 248°F)

B0 Ø 12.70 x 9.53  
B2 Ø 31.75 x 11.20  
B3 Ø 38.10 x 18.00

Theatrical rigging loads, assembly forces, weighing, thrust measurements, product validation testing

## Load Cells

### Test and Measurement



#### XFC200R

<b>Package</b>	Small diameter load button
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- High stiffness - High overload capacity - Static and dynamic
<b>Ranges N (Lbf)</b>	2 to 10K (0.4 to 2K)
<b>Max Over-range</b>	2X to 4X F.S.
<b>Output / Span</b>	100 mV
<b>Non-linearity</b>	≤ ±0.5% F.S.
<b>Hysteresis</b>	≤ ±0.5% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Ø 10 to Ø 16
<b>Typical Apps</b>	Material test, measuring tools, robotics and effectors



#### XFL212R

<b>Package</b>	Low profile load button
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- Extremely flat - Integrated load button - Small diameter
<b>Ranges N (Lbf)</b>	5 to 500 (1 to 100)
<b>Max Over-range</b>	2X F.S.
<b>Output / Span</b>	100 mV
<b>Non-linearity</b>	≤ ±0.5% F.S.
<b>Hysteresis</b>	≤ ±0.5% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Ø 12.5 x 3.5
<b>Typical Apps</b>	Dental and biomechanical, surface mount assembly system, production validation test



#### XFL225D

<b>Package</b>	Through hole
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- Strain relief spring - Very flat - Static and dynamic
<b>Ranges N (Lbf)</b>	10 to 5K (2 to 1K)
<b>Max Over-range</b>	2X F.S.
<b>Output / Span</b>	100 mV
<b>Non-linearity</b>	≤ ±0.5% F.S.
<b>Hysteresis</b>	≤ ±0.5% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Ø 25
<b>Typical Apps</b>	Bolt loads, tool forces, biomechanical force measurement



#### XFTC300 Series

<b>Package</b>	Low/high capacity dual stud
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- High stiffness - High overload capacity - Threaded male / female fitting
<b>Ranges N (Lbf)</b>	2 to 2K (0.4 to 400)
<b>Max Over-range</b>	2X to 4X F.S.
<b>Output / Span</b>	100 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	≤ ±0.5% F.S.
<b>Hysteresis</b>	≤ ±0.5% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Material test, tool forces, robotics end effectors

### Standard



#### ELHM, ELHS

<b>Package</b>	High capacity dual stud or button style
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Tension and compression or compression only - High stability metal foil strain gage (ELHM) - High output semiconductor strain gage (ELHS) - NIST traceable calibration provided
<b>Ranges N (Lbf)</b>	1K to 50K (200 to 10K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	10 mV (ELHM), 200 mV FSO (ELHS)
<b>Non-linearity</b>	0.3% to 0.5% FSO
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-50°C to 120°C (ELHM), -20°C to 80°C (ELHS)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Robust general purpose, low deflection design: machine tool, linkage forces



#### FN3002

<b>Package</b>	Very high capacity dual stud
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Threaded male fitting - Integrated amplifier - Optional rod end
<b>Ranges N (Lbf)</b>	10K to 2,000K (2K to 400K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.25% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Assembly forces, tool force, offshore



#### FN2420

<b>Package</b>	Very high capacity load button
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- High stiffness - Optional load button - Optional high level output module
<b>Ranges N (Lbf)</b>	20K to 5,000K (4K to 1,000K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	20 mV (4 V; 5 V)
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	±0.1% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Calibration presses, robotics and effectors, laboratory and research



#### FN1010

<b>Package</b>	Load pin design
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Keyed antirotation slot - Bidirectional available - Optional watertight construction
<b>Ranges N (Lbf)</b>	10K to 2,000K (2K to 400K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V; 4 - 20 mA optional)
<b>Non-linearity</b>	±1% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Crane monitoring, offshore, load-limited devices

## Load Cells

### S-Beam Standard



#### FN3030

<b>Package</b>	S-beam
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Optional rod ends - Optional high level output - Low cost
<b>Ranges N (Lbf)</b>	50 to 100K (10 to 20K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Laboratory and research, process control, robotics and effectors



#### FN3060

<b>Package</b>	S-beam
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Fatigue rated - Optional high level output - S-beam technology
<b>Ranges N (Lbf)</b>	250 to 2.5K (50 to 500)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±15 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 120°C (-40°F to 248°F)
<b>Dimensions (mm)</b>	50 x 25 x 60
<b>Typical Apps</b>	Test bed, dynamic fatigue testing, robotics and effectors



#### FN3280

<b>Package</b>	S-beam with stops
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Very low range - High resolution - Mechanical stops
<b>Ranges N (Lbf)</b>	1 to 5 (0.2 to 1)
<b>Max Over-range</b>	40X to 100X F.S.
<b>Output / Span</b>	±10 to 20 mV
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Product validation tests, medical instruments, weighing



#### FN3148

<b>Package</b>	S-beam with stops
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Very high accuracy - High resolution - Mechanical stops
<b>Ranges N (Lbf)</b>	10 to 2K (2 to 400)
<b>Max Over-range</b>	5X to 100X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	< ±0.05% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 120°C (-40°F to 248°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Product validation tests, medical instruments, weighing



#### FN7110

<b>Package</b>	Dual S-beam range
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- High resolution - Optional high level output - Double range
<b>Ranges N (Lbf)</b>	10 / 100 to 1K / 10K (2 / 20 to 200 / 2K)
<b>Max Over-range</b>	1.2X F.S. of the higher range
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.1% F.S. of each range
<b>Hysteresis</b>	
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	60 x 30 x 100
<b>Typical Apps</b>	Product validation tests, process control, robotics and effectors

### Low Profile and Pan-Cake



#### FMT

<b>Package</b>	Washer
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- High stiffness - 1.5X over-range - High temperature
<b>Ranges N (Lbf)</b>	20K to 320K (4K to 64K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	15 to 20 mV
<b>Non-linearity</b>	1 to 5% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Robotics, process control, blot clamping for bridges



#### FN3050

<b>Package</b>	Pan-Cake
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Connector or cable gland output - Same housing all ranges - Optional high level output - Optional compression stops
<b>Ranges N (Lbf)</b>	100 to 20K (20 to 4K)
<b>Max Over-range</b>	1.5X F.S. (10X F.S. with stops)
<b>Output / Span</b>	±15 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	±0.1% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Ø70 x 25
<b>Typical Apps</b>	Regulation, laboratory and research, robotics



#### FN3000

<b>Package</b>	Very high capacity Pan-Cake
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- High stability - Aluminum or stainless steel - Optional high level output
<b>Ranges N (Lbf)</b>	10K to 1000K (2K to 200K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	±0.1% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Static fatigue tests, weighing calibration, robotics



#### FN3042

<b>Package</b>	Pan-Cake
<b>Operating Mode</b>	Tension and compression
<b>Unique Features</b>	- Integrated amplifier - Optional Skydrol compatibility - Fatigue rated
<b>Ranges N (Lbf)</b>	5K to 500K (1K to 100K)
<b>Max Over-range</b>	2X F.S.
<b>Output / Span</b>	±15 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±0.25% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 120°C (-40°F to 248°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Aerospace test bed, dynamic fatigue tests, robotics and effectors



#### FN7325

<b>Package</b>	Custom design / ranges on request
<b>Operating Mode</b>	Multiaxial force and torque
<b>Unique Features</b>	- Measures Load / Torque in 3 directions - Fatigue rated - Minimal cross effects
<b>Ranges N (Lbf)</b>	5K to 250K (1K to 50K)
<b>Max Over-range</b>	1.2X F.S.
<b>Output / Span</b>	±100 to 150 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	±1% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Structure testing, crash testing, industrial test benches

## Torque Meters

### Reaction and Rotary



#### CS1060

<b>Package</b>	Square male coupling
<b>Operating Mode</b>	Reaction
<b>Unique Features</b>	- Optional high level output - Static measurements
<b>Ranges Nm (Lbf-ft)</b>	±5 to ±7K (±4 to ±5.6K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Combined Non-linearity &amp; Hysteresis</b>	< ±0.25% F.S.
<b>Optional Operating Temp</b>	-20°C to 100°C (-4°F to 212°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Non-rotating parts torque measurement, robotics and effectors, laboratory and research



#### CS1120

<b>Package</b>	Keyed shaft connections
<b>Operating Mode</b>	Reaction
<b>Unique Features</b>	- Optional high level output - Excellent temp. stability
<b>Ranges Nm (Lbf-ft)</b>	±5 to ±2.5K (±4 to ±2K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Combined Non-linearity &amp; Hysteresis</b>	< ±0.25% F.S.
<b>Optional Operating Temp</b>	-20°C to 100°C (-4°F to 212°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Non-rotating parts torque measurement, robotics and effectors, laboratory and research



#### CS1210

<b>Package</b>	Collar mechanical fittings
<b>Operating Mode</b>	Reaction
<b>Unique Features</b>	- High stiffness - Optional high level output
<b>Ranges Nm (Lbf-ft)</b>	±160 to ±10K (±128 to ±8K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Combined Non-linearity &amp; Hysteresis</b>	< ±0.25% F.S.
<b>Optional Operating Temp</b>	-40°C to 150°C (-40°F to 302°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Non-rotating parts torque measurement, robotics and effectors, laboratory and research



#### CD1050

<b>Package</b>	Square male couplings
<b>Operating Mode</b>	Dynamic rotary
<b>Unique Features</b>	- Optional high level output - Rugged
<b>Ranges Nm (Lbf-ft)</b>	±5 to ±7K (±4 to ±5.6K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Combined Non-linearity &amp; Hysteresis</b>	< ±0.25% F.S.
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Engine efficiency, robotics and effectors, laboratory and research



#### CD1095

<b>Package</b>	Keyed shaft connections
<b>Operating Mode</b>	Dynamic rotary
<b>Unique Features</b>	- Optional high level output
<b>Ranges Nm (Lbf-ft)</b>	±5 to ±2.5K (±4 to ±2K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V; ±5 V optional)
<b>Combined Non-linearity &amp; Hysteresis</b>	< ±0.25% F.S.
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Engine efficiency, process control equipment, laboratory and research

## Load Cells

### Automotive Sensors



#### FN4070 - FN4080

<b>Package</b>	Seat belt buckle sensor
<b>Operating Mode</b>	Tension
<b>Unique Features</b>	- High operating ranges - Detachable tongue and cable - Compatible with most seat belts
<b>Ranges N (Lbf)</b>	250 to 50K (50 to 10K)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	15 to 20 mV
<b>Non-linearity</b>	±0.5% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Auto crash testing, tension at the belt receptacle



#### FN2317

<b>Package</b>	Hand brake
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- Easily installed - Ergonomic design - Fits most vehicles
<b>Ranges N (Lbf)</b>	500 to 1K (100 to 200)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	±20 mV (4 V optional)
<b>Non-linearity</b>	±0.5% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	100 x 20 x 15
<b>Typical Apps</b>	Hand brake, test bed



#### FN2114 - FN2570

<b>Package</b>	Brake pedal
<b>Operating Mode</b>	Compression
<b>Unique Features</b>	- High accuracy - Extra flat - Compact - Rugged design
<b>Ranges N (Lbf)</b>	200 to 3K (40 to 600)
<b>Max Over-range</b>	1.5X F.S.
<b>Output / Span</b>	15 to 20 mV (4 V optional)
<b>Non-linearity</b>	< ±1% F.S. (FN2114); < ±2.5% F.S. (FN2570)
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Brake pedal, clutch pedal, test bed

## Automotive Design and Test Sensors



### FN7080

<b>Package</b>	Gear stick design
<b>Operating Mode</b>	Multi-axial
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Measures force in three directions</li> <li>- Replaces gear knob</li> <li>- Ease of mounting</li> </ul>
<b>Ranges N (Lbf)</b>	50 to 500 (10 to 100)
<b>Max Over-range</b>	1.2X F.S.
<b>Output / Span</b>	±7.5 mV (4 V; ±5 V optional)
<b>Non-linearity</b>	< ±0.3% F.S.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Ø 25 (0.98) spherical
<b>Typical Apps</b>	Change gear force measurement, roughness of material



### FCA7300

<b>Package</b>	Steering wheel adaptable
<b>Operating Mode</b>	Multi-sensing
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Dual torque / Angle range</li> <li>- Steering velocity measurement</li> <li>- Fits all road vehicles</li> </ul>
<b>Ranges N (Lbf)</b>	10 to 200 Nm (7 lbf-ft to 150 lbf-ft)
<b>Max Over-range</b>	10X F.S.
<b>Output / Span</b>	±10 V
<b>Non-linearity</b>	±0.1% F.S.
<b>Hysteresis</b>	±0.1% F.S.
<b>Optional Operating Temp</b>	-20°C to 80°C (-4°F to 176°F)
<b>Dimensions (mm)</b>	Ø 195 x 50
<b>Typical Apps</b>	On car road test, truck and buses steering test, armored vehicles steering test



### EL20-S458

<b>Package</b>	Special purpose design optimized for automotive crash test environments
<b>Operating Mode</b>	Seat-belt tension
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Low mass titanium design for use in high shock environments</li> <li>- Mass optimized to minimize acceleration induced errors during SAE J2570 ATD and ISO 6487</li> <li>- Optional high level and linearized outputs</li> <li>- Smoothed edge design and optional slotted titanium axles eliminate drag errors and dummy damage</li> <li>- Ultra robust cable is user replaceable</li> </ul>
<b>Ranges N (Lbf)</b>	5K and 15K (1000 and 3200)
<b>Max Over-range</b>	2X
<b>Output / Span</b>	10 mV (0.5 - 4.5 V optional)
<b>Non-linearity</b>	1.0% to 3.0% F.S.O.
<b>Hysteresis</b>	Combined with linearity
<b>Optional Operating Temp</b>	-40°C to 120°C (-40°F to 248°F)
<b>Dimensions (mm)</b>	Application dependent
<b>Typical Apps</b>	Seat belt forces, safety and restraint system crash test, parachute tether/riser forces

## Electronics /Displays



### ARD154

<b>Package</b>	Din rail mountable
<b>Operating Mode</b>	Signal conditioning for Wheatstone bridge sensors
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Suited for 1 to 4 strain gage sensors</li> <li>- 120 to 10000 Ohm bridge Impedance</li> <li>- ±10 V Analogue or 0 / 4 - 20 mA current output</li> <li>- 2 kHz or 20 kHz max. bandwidth</li> <li>- Calibration pushbutton from 0.1 to 10 mV/V</li> </ul>
<b>Ranges N (Lbf)</b>	Application dependent
<b>Output / Span</b>	±10 V max; 4 - 20 mA or 0 - 20 mA
<b>Accuracy</b>	0.01% F.S.
<b>Optional Operating Temp</b>	-10°C to 60°C (14°F to 140°F)
<b>Dimensions (mm)</b>	99 x 17.5 x 112
<b>Typical Apps</b>	Test stands, power plants, manufacturing systems, test and measurement, test bed regulation, automat interfaces



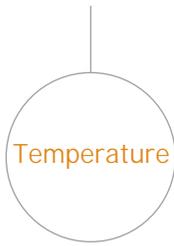
### M210

<b>Package</b>	Front panel or housed in case
<b>Operating Mode</b>	Signal conditioning and display meter
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Analog output : ±10 V</li> <li>- Red LED display : ±2,000 count</li> <li>- High bandwidth: 1,000 Hz at -3 dB</li> <li>- Low noise level</li> </ul>
<b>Ranges N (Lbf)</b>	Application dependent
<b>Output / Span</b>	±10 Vdc
<b>Accuracy</b>	±0.05% F.S.
<b>Optional Operating Temp</b>	0°C to 50°C (32°F to 122°F)
<b>Dimensions (mm)</b>	96 x 48 x 155
<b>Typical Apps</b>	High bandwidth test bed display, monitoring, laboratory and research, process control equipment



### M905

<b>Package</b>	Front panel or housed in case
<b>Operating Mode</b>	Display suited for process or strain gauge type sensors
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Suited for process or strain gauge type sensors</li> <li>- 5 digits: -19999 to 19999</li> <li>- Front panel programming</li> <li>- 11 point scaling</li> <li>- Plug-in option boards</li> </ul>
<b>Ranges N (Lbf)</b>	Application dependent
<b>Output / Span</b>	±10 Vdc or 4 - 20 mA with option
<b>Accuracy</b>	±15 bits, 20 sample/sec
<b>Optional Operating Temp</b>	-10°C to 60°C (14°F to 140°F)
<b>Dimensions (mm)</b>	96 x 48 x 60
<b>Typical Apps</b>	Display on test bed, monitoring, laboratory and research



# Temperature

Measurement Specialties is the market leader in temperature measurement. We manufacture NTC thermistors, RTD components, thermocouples, thermopiles, digital output and customized probe assemblies. Building on over 100 years of experience, we put to use our unique know-how to cover the largest range of temperature measurement, control and compensation applications in the industry. We offer the widest selection of products to meet the specific demands of temperature sensing OEM applications, including medical, aerospace, automotive, instrumentation appliances and HVAC. Our long, extensive and successful experience supporting industries with very high quality and service expectations, as well as aggressive cost competitiveness, make Measurement Specialties the number one choice for your application.



# NTC Thermistor and Nickel and Platinum RTD Components

## Analog Output

				
<b>NTC Package</b>	<b>Thermistor Chips</b> Leadless Chips	<b>Thermistor SMDs</b> SMD 0402, 0603, 0805	<b>Leaded Thermistors</b> Radial, axial, beads	<b>Space Qualified (Hi-Rel)</b> Radial, bead, custom
<b>Type</b>	Gold or silver electrodes	Surface mounted	Epoxy or glass coated	Epoxy, glass, probes
<b>Resistance Range</b>	100 to 1MΩ	40 to 500kΩ	100 to 1MΩ	1kΩ to 100kΩ
<b>Unique Features</b>	- Wire bonding compatible	- End band SMD	- Interchangeable - Moisture resistant - Stability	- ESA and NASA approved - High reliability and accuracy
<b>Accuracy</b>	±1% to 10%	±1% to 10%	0.25% to 20%	0.5% to 10%
<b>Operating Temp.</b>	-40°C to 125°C	-40°C to 125°C	-55°C to 280°C	-55°C to 115°C
<b>Dimensions (mm)</b>	1 x 1 x 0.25	0402: 1 x 0.5 x 0.7 0603: 1.6 x 0.8 x 1 0805: 2 x 1.25 x 1.2	0.4 to 4.9	From 2.4
<b>Typical Apps</b>	Temperature compensation, communication (DWDM), infrared sensing systems	Temperature compensation, PCB mounting temperature measurement	Temperature sensing for OEM, automotive, medical, HVAC, etc.	Instrumentation and compensation for aerospace applications

## Digital Output

					
<b>RTD Package</b>	<b>Nickel-RTD SMD</b> SOT 23	<b>Thin Film Sensors</b> TFC, TFS, TFHT	<b>Glass Wire Wound Sensors</b> GO, GX	<b>Ceramic Wire Wound Sensors</b> CWW600, CWW850, CWW1000	<b>TSYS Series</b> QFN16
<b>Type</b>	Surface mounted	Thin-film platinum deposited on ceramic substrate, glass coated, radial leads	Glass rod, radial leads	Ceramic rod, radial leads	SPI / I <sup>2</sup> C interface
<b>Resistance Range</b>	1kΩ	100Ω, 500Ω, 1000Ω	100Ω (2x100Ω on few versions)	100Ω (2x100Ω on few versions)	--
<b>Unique Features</b>	- Harsh environment compatible	- Small dimensions - High electrical insulation - Short response time - Interchangeability	- Aggressive environments (acid, oil, solvent) - Small dimensions - Stability - No hysteresis - Short response time - Interchangeability	- High temperature - Stability - No hysteresis - Small dimensions - Interchangeability	- Low power - 16 / 24 bit resolution - Internal calibration
<b>Accuracy</b>	Class B according to DIN 43760	Class F0.6, F0.3, F0.15, F0.1 according to IEC60751	Class W0.3, W0.15, W0.1 according to IEC60751	Class W0.3, W0.15, W0.1 according to IEC60751	±0.1°C @ -5°C to 50°C
<b>Operating Temp.</b>	-55°C to 160°C	-200°C to 150°C (TFC) -70°C to 500°C (TFS) -70°C to 850°C (TFHT)	-200°C to 400°C	-200°C to 600°C (CWW600) -200°C to 850°C (CWW850) -200°C to 1000°C (CWW1000)	-40°C to 125°C
<b>Dimensions (mm)</b>	2.1 x 2.5 x 2.1	Width 0.8 to 2.5 mm Length 2 to 10 mm Thickness ≤ 1 mm Typical leads length = 10 mm	Ø 1.8 / Length 5mm to Ø 4.5 / Length 48mm	Ø 1.5 / Length 8 mm to Ø 4.5 / Length 30 mm Ø 2.7 / Length 45 mm (CWW1000)	4 x 4 x 0.85
<b>Typical Apps</b>	Automotive, compensation, OEM	OEM, automotive, aerospace, medical	Oil and chemical industry, aviation, aeronautic, food industry	Process industry, laboratories, reference sensors	Industrial control, replace thermistors and NTCs, heating / cooling systems, HVAC

## Probe Assemblies

						
	<b>Ring Probe</b>	<b>Push-in Probe</b>	<b>Screw-in Probe</b>	<b>Pipe Clamp Probe</b>	<b>Pipe Probe</b>	<b>Urea Temperature Sensor</b>
<b>Package</b>	Ring for surface assembly	Brass, copper or stainless steel closed-end tube	Brass, copper or stainless steel housing, integrated connector	Plastic housing with metal insert	Copper housing	Plastic housing with screw hole mountings
<b>Type</b>	Epoxy potted	Sensitive element potted into housing and cable prolongation or connection head	Sensitive element potted into housing and cable prolongation or connection head	Overmolded or epoxy potted	Over molded	Overmolded plastic housing with integrated 2 pin connector
<b>Sensor Range</b>	NTC, Pt, Ni sensor	NTC, Pt, Ni sensor	NTC, Pt, Ni sensor	NTC, Pt sensor	NTC Thermistor	
<b>Unique Features</b>	- Surface mount temperature sensing	- Corrosion resistant - Available with mounting tabs or clips	- Corrosion resistant - Different types of treads - O-rings and connectors available	- Different pipe diameters available	- Fast response time	- Temperature measurement of urea liquid used in selective catalytic reduction (SCR) systems - Suitable for high pressure applications
<b>Accuracy</b>	- Custom tolerances available (NTC) - Class B, A, AA according to IEC60751 (Pt)	- Custom tolerances available (NTC) - Class B, A, AA according to IEC60751 (Pt)	- Custom tolerances available (NTC) - Class B, A, AA according to IEC60751 (Pt)	- Custom tolerances available (NTC)	- ±2% Beta tolerance	- Custom tolerances available (NTC) - ±2%, 3% and 5%. Beta 25/85 : 3976
<b>Operating Temp.</b>	-40°C to 150°C	-40°C to 260°C	-40°C to 260°C	-40°C to 105°C	-40°C to 125°C	-40°C to 125°C
<b>Dimensions (mm)</b>	Ring hole dia. from 3 to 5 (custom dimensions available)	Custom lengths and diameters available	Custom lengths, diameters and thread available	Custom diameters available	1000 x 10	Sensor tip 8mm Dia.
<b>Typical Apps</b>	Surface plates, heat exchangers, and fluid pumping systems	Boiler, liquid, evaporator, HVACR, Industrial processes control, district heating/cooling, automotive	Boiler, liquid, HVACR, Industrial processes control, district heating/cooling, automotive	Pipe surface temperature sensing, HVACR	Industrial process, boiler control	Temperature measurement of urea liquid used in selective catalytic reduction (SCR) systems
						
	<b>Over Molding Probe</b>	<b>Patient Monitoring Probe</b>	<b>TLH Reference Probe</b>	<b>Flexible Surface Probe</b>	<b>Boiler Probe</b>	
<b>Package</b>	PVC or TPE	Sensor with cable and connector	TLH100 / TLH600	SP683	Brass housing	
<b>Type</b>	Overmolded	Reusables, disposables	Rigid protective external sheath of Inconel600 and stainless steel handle, unique internal design to insure stability	Flexible silicone molding CPE option: silicone molding on cable GAL option: rigid aluminum protection	Screw	
<b>Sensor Range</b>	NTC, Pt sensor	400 Series, 700 Series	Pt100 sensor	Pt100 sensor	NTC thermistor	
<b>Unique Features</b>	- Mounting clips available	- Autoclavable reusables - Sterile disposables	- Stability - Provided with calibration report or option of calibration certificate by national committee for accreditation (COFRAC)	- Small thickness - Curved surface radius ≥ 25 mm	- Integrated connector	
<b>Accuracy</b>	- Custom tolerances available (NTC) - Class B, A, AA according to IEC60751 (Pt)	EN-12470 ±0.1°C 25°C to 45°C	Class B (TLH600), A (LTH100) according to IEC60751	Class B, A, AA according to IEC60751	±1% tolerance on Beta	
<b>Operating Temp.</b>	-40°C to 125°C	Lab -40°C to 100°C, patient 0°C to 50°C	-80°C to 350°C (TLH100) -180°C to 600°C (TLH600)	-70°C to 200°C	-40°C to 125°C	
<b>Dimensions (mm)</b>	8 x 30, 6.5 x 25, 6 x 50, 6 x 5 x 15	Reusables 3 m	OD Ø 5 x 500 + handle Ø 15 x 100 typical cable length = 2 m	L 23 x W 10 x TH 1.5 custom cable length	41.8 x 11.5	
<b>Typical Apps</b>	HVACR, industrial processes control	Patient monitoring, laboratory	Laboratory, temperature sensors calibration by comparison	Chemical and pharmaceutical industry, process industry, laboratory, aerospace	Industrial process, boiler control	

## Probe Assemblies



### Stator Winding Probe

**Package** TPE / CPME  
**Type** - Rigid flat/slot sensor with cable prolongation

**Sensor Range** Pt100 sensor

**Unique Features** - Dielectric strength 3 KV(TPE), 5 KV (CPME)  
 - ATEX EExi according to type

**Accuracy** Class B, A according to IEC60751

**Operating Temp.** -20°C to 180°C

**Dimensions (mm)** - 150 x 8 x 2 (TPE)  
 - 60 x 10 x 2, 80 x 10 x 2.3, 80 x 7.5 x 2 (CPME)  
 - Typical cable lengths = 5, 10, 15, 25 m

**Typical Apps** Power plants, measurement in stator windings (alternator, motor)



### Oven Probe

**OVN**  
 - Pt element encapsulated into ceramic tube, with rigid stainless steel housing  
 - High temperature cable and connector

Pt100, Pt500, Pt1000 sensor

- High temperature  
 - Easy integration/installation  
 - Higher dielectric strength according to type

Class B, C according to IEC60751

-20°C to 750°C (according to version)

- OD Ø 4 mm to Ø 6 mm  
 - Immersion length 35 mm to 100 mm  
 - Custom mechanical interface and cable length

Drying oven, domestic oven



### Exhaust Gas Temperature Probe

EGT thermocouple probe  
 - Mineral insulated alloy sheath, screwed mechanical interface, cable extension and automotive connector  
 - Option: CAN bus interface (from 1 to 4 thermocouples, fully configurable)

Type K or N

- High temperature  
 - Robust design  
 - Vibration and corrosion withstand  
 - Fast respond time

Class 1 according to IEC584

-40°C to 900°C

- Ø OD 4 to Ø OD8 mm  
 - Custom immersion length and cable length

Automotive, truck, mining, Power unit, racing.



### Thermocouple Probe

T01 / T11 / Spike / Profile / C01 / C06

- Bendable sheath: Mineral Insulated and alloy sheath (T01)  
 - Flexible cable with plastic or composite insulation (T11)  
 - Rigid protection sheath: ceramic (Spike, C06), quartz (Profile) or alloy sheath (C01)  
 - Option: connector

Type T, J, K, N, R, S, B (according to TC type and insulation type)

- High temperature  
 - For MI cable: robust design, vibration withstand, small diameters, fast respond time, collapsible (radius ≥ 5°OD)  
 - Apparent hot junction, disposable for flexible cable

Class 1 according to IEC584

-40°C to 1700°C (according to TC type and insulation type)

- OD Ø 0.3 mm to Ø 8 mm for MI  
 - Custom immersion length (from few centimeters to many meters)  
 - Custom cable length  
 - Multipoints (from 1 to 6) for Profile

Aeronautic, process industry, semiconductor industry (spike, profile), medical process industry, manufacture based on composite materials

## Thermopiles



### TS Series

TS318-3B0814, TS318-5C50, TS305-10C50

**Package** TO-18, TO-18, TO-5  
**Type** Thermopile sensor components

**Temp. Range** Depends on applied electronics and calibration, filter types optimal for object temperature range -40°C to 300°C (extended range: -60°C to 1000°C)

**Unique Features** - High signal output  
 - Accurate reference sensors

**Accuracy** Depends on applied electronics and calibration

**Operating Temp.** Ambient temperature range: -20°C to 85°C

**Dimensions (mm)** 9 x 9 x 17.6

**Typical Apps** Medical thermometer (ear, forehead), pyrometer



### TSEV Series

TSEV01CL55

OEM-module  
 Single-pixel thermopile module with integrated lens

Object temperature range 0°C to 300°C

- Calibrated and ready to use  
 - Digital output  
 - Small field of view

Depends on temperature range, typical 1.5% full scale

Ambient temperature range: -20°C to 85°C

36 x 18 x 16.15

Contactless temperature measurement, e.g. on moving parts or heated rolls, laminators, people detection, microwave oven, air conditioner



### TSEV Series

TSEV0108L39

OEM-module  
 8-pixels-linear array thermopile module

Object temperature range -20°C to 120°C

- Calibrated and ready to use  
 - Digital output  
 - Small field of view

Depends on temperature range, typical 2% full scale

Ambient temperature range: -20°C to 85°C

25 x 35 x 15.2

Contactless temperature measurement, e.g. on moving parts or heated rolls, laminators, people detection, microwave oven, air conditioner



### TPT Series

TPT300V

IP65 stainless steel tube  
 Thermopile system for industrial use

Object temperature range 0°C to 300°C

- Calibrated and ready to use  
 - Digital or analogue outputs  
 - Small field of view

Depends on temperature range, typical 1% full scale

Ambient temperature range: 0°C to 85°C

111 x 17 x 17

Contactless temperature measurement, e.g. on moving parts or heated rolls, control of assembly lines, paper fabrication, drying applications

Solutions by Sensor Type: **Humidity**

# Humidity

Based on a robust patented capacitive technology, Measurement Specialties offers a complete range of calibrated and amplified products measuring relative humidity. Accurate dew point and absolute humidity measurements are made possible through the combination of relative humidity and temperature measurements. Our products are qualified for the most demanding applications including automotive, heavy truck, aerospace and home appliance. We offer a variety of output signals including digital (frequency, I<sup>2</sup>C) and analog voltage, as well as customized and proprietary output including PWM, PDM, LIN and CAN.



## Humidity and Temperature (NTC) Components

### Analog Output



#### HS1101LF

<b>Package</b>	Through hole TO39 with side opening plastic cap
<b>Type</b>	Capacitive humidity
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-60°C to 140°C
<b>Unique Features</b>	- Very robust and recognized component capable of withstanding most of the applications in the humidity world in very cost effective ways
<b>Accuracy</b>	180 pF $\pm$ 3 pF @55% RH
<b>Dimensions (mm)</b>	10 x 10 x 19
<b>Typical Apps</b>	Applications requiring a robust humidity sensor in automotive, home appliance, outdoor, HVAC, consumer, printer, meteorology

### Digital Output



#### HTU2X Series

<b>Package</b>	DFN type
<b>Type</b>	Digital RH and temperature
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 125°C
<b>Unique Features</b>	- Low power consumption - Fast response time - Very low temperature coefficient - I <sup>2</sup> C interface or PWM interface or SDM interface
<b>Accuracy</b>	$\pm$ 3% RH @ 25°C (10 to 95% RH) $\pm$ 0.3°C @ 25°C
<b>Dimensions (mm)</b>	3.0 x 3.0 x 1.0
<b>Typical Apps</b>	Humidity and temperature plug and play transducers for OEM demanding applications in automotive, home appliance, printer, medical, humidifier

## Humidity and Temperature (NTC) Mini-Modules

### Analog Voltage and Digital Output



#### HTG353xCH/PVBL/WxGy

<b>Package</b>	Cost effective small size mini-module
<b>Type</b>	Analog voltage RH and NTC temperature
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 110°C
<b>Unique Features</b>	- PTFE filter - Electronics fully protected with potting material (3.3 Volt or 5 Volt) - Multiple connector choices (JST, samtec board to board through hole)
<b>Calibration</b>	$\pm$ 3% RH @ 55% RH; $\pm$ 0.25°C @ 25°C
<b>Dimensions (mm)</b>	27 x 11.9 x YY (depending on the connector, from 6 to 10.8 mm length)
<b>Typical Apps</b>	Humidity and temperature plug and play transducers for OEM demanding applications in HVAC, home appliance, printer, medical, and outdoor

#### HTG383xCH/PVBL/WxGy

<b>Package</b>	Cost effective small size mini-module
<b>Type</b>	Digital RH and temperature
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 85°C
<b>Unique Features</b>	- PTFE filter - Electronics fully protected with potting material - Multiple connector choices (JST, samtec board to board through hole and SMD)
<b>Calibration</b>	$\pm$ 3% RH @ 55% RH; $\pm$ 0.4°C @ 25°C
<b>Dimensions (mm)</b>	27 x 11.9 x YY (depending on the connector, from 6 to 10.8 mm length)
<b>Typical Apps</b>	Humidity and temperature plug and play transducers for OEM demanding applications in home appliance, consumer, printer

#### HTG351xCH

<b>Package</b>	Cost effective small size mini-module
<b>Type</b>	Analog voltage RH and NTC temperature
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 110°C
<b>Unique Features</b>	- Electronics fully protected with potting material (3.3 Volt or 5 Volt) - Multiple connector choices (JST, samtec board to board through hole)
<b>Calibration</b>	$\pm$ 3% RH @ 55% RH; $\pm$ 0.25°C @ 25°C
<b>Dimensions (mm)</b>	27 x 11.9 x 6.7
<b>Typical Apps</b>	Humidity and temperature plug and play transducers for OEM low cost consumer applications

## Humidity and Temperature (NTC) Sensors | Humidity and Temperature (NTC) Probes

### Frequency Output Systems (Digital)



#### HTF300OLF

<b>Package</b>	PCB for Board to Board
<b>Type</b>	Frequency output for RH, direct NTC for T
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 85°C
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Voltage supply from 3 to 8 Vdc</li> <li>- Through hole or SMD</li> <li>- T&amp;R available</li> </ul>
<b>Calibration</b>	±3% RH @ 55% RH and ±0.25°C @ 25°C
<b>Dimensions (mm)</b>	12.5 x 18.5 x 11.2
<b>Typical Apps</b>	Passenger comfort improvement, hygrostat, HVAC, printer

### Analog Voltage



#### HM150OLF

<b>Probe / RH only</b>
Cost effective analog voltage RH probe
0 to 100% RH
-40°C to 60°C
<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
±3% RH @ 55% RH
57 x 11 x 11 (standard wire length of 200 mm)
Medical, telecommunication cabinets, green houses, process control, industrial



#### HM152OLF

<b>Probe / RH only</b>
Dedicated to low RH accurate measurement
0 to 100% RH
-40°C to 60°C
<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
±3% RH @ 10% RH
57 x 11.5 x 11.5 (standard wire length of 200 mm)
Medical, drying cabinets, low humidity, meteorology



#### HTM250OLF

<b>Probe RH and T</b>
Cost effective analog voltage RH
0 to 100% RH
-40°C to 85°C
<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
±3% RH @ 55% RH; ±0.25°C @ 25°C
86 x 11.5 x 11.5 (standard wire length of 200 mm)
Hygrostat, data loggers, baby cabinets

## E&V Humidity and Temperature Modules



#### H2TG / H2TD Series \*

<b>Package</b>	Cost effective module for automotive defogging application
<b>Type</b>	<ul style="list-style-type: none"> <li>- Dew point and windshield temperature measurement</li> <li>- Analog or digital (LIN) output</li> </ul>
<b>Operating RH Range</b>	0 to 100% RH
<b>Operating Temp</b>	-40°C to 85°C
<b>Pressure Range</b>	--
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
<b>Calibration</b>	±2% RH @ 80% RH ±1°C @ 25°C
<b>Dimensions (mm)</b>	27 x 32 x YY (depending on the connector, from 6 to 10.8 mm length)
<b>Typical Apps</b>	Fogging and cabin energy control



#### HTM2500B6Cy \*

<b>Engine probe for truck and automotive</b>
<ul style="list-style-type: none"> <li>- Dew point measurement</li> <li>- Analog output</li> </ul>
0 to 100% RH
-40°C to 105°C
--
<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
±3% RH @ 55% RH ±0.8°C @ 25°C
70 x 64.5 x 54.5 (integrated connector)
Humidity and temperature engine control



#### HTD2800B11C6 \*

<b>Engine probe for truck and automotive</b>
<ul style="list-style-type: none"> <li>- Temperature, RH, pressure measurement</li> <li>- CAN output</li> </ul>
0 to 100% RH
-40°C to 125°C
0 - 15kPa to 115kPa
<ul style="list-style-type: none"> <li>- Configurable outputs available as SH or DP parameters</li> <li>- Self diagnostic capabilities to comply with J1939, EPA / Euro and CARB requirements</li> </ul>
RH: ±3% RH @ 55% RH Temp: ±0.5°C @ 25°C Pressure: ±1% FS
76.3 x 64.3 x 55.9 (integrated connector)
Emission control application such as NOx control with air intake measurements



#### HTM4300B14C8 \*

<b>Engine probe for truck and automotive</b>
<ul style="list-style-type: none"> <li>- Dew point measurement</li> <li>- Analog output</li> </ul>
0 to 100% RH
-40°C to 105°C
--
<ul style="list-style-type: none"> <li>- Electronics fully protected with potting material</li> <li>- Optional wiring length and connectors</li> </ul>
±3% RH @ 55% RH ±0.25°C @ 25°C
46.8 x 40.4 x 36.6 (integrated connector)
Humidity and temperature automotive engine control

\* Please consult us for specific request

Solutions by Sensor Type:



# FLOW

Measurement Specialties manufacturers Mass Air Flow (MAF) sensors for a variety of Automotive, Medical and Industrial Gas Flow applications where reliable and accurate measurements are specified. They are typically mounted in a well-defined channel, directly in the flowing media. Our Flow Switches are designed for water control, power shower, central heating systems, circulation pump protection, cooling and leak detection. They feature reed switch reliability and are easily installed. Suitable for hot and cold potable water, these sensors have rugged brass housings and operate from a small head of water.



## Mass Air Flow Sensors



### LMM-H04

<b>Package</b>	Hybrid
<b>Type</b>	Anemometer film component
<b>Range</b>	650 Ω to 1050 Ω
<b>Operating Temp</b>	-40°C to 125°C
<b>Unique Features</b>	Fast response time, adaptable, constant power or constant voltage operation
<b>Calibration / Accuracy</b>	Dependent on electronics
<b>Dimensions (mm)</b>	23 x 10.15 x 1.1
<b>Typical Apps</b>	Combustion engine air intake, spirometer, leak detection, industrial gas flow

## Flow Switches

For Direction of Liquid and Gas Flow



### FS-01

<b>Package</b>	Noryl
<b>Type</b>	Flow switch
<b>Range</b>	10 Bar @ 20°C
<b>Operating Temp</b>	-30°C to 85°C
<b>Unique Features</b>	SPST reed switch, normally open, close on flow
<b>Calibration / Accuracy</b>	N/A
<b>Dimensions (mm)</b>	106 x 32 x 32
<b>Typical Apps</b>	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-02

<b>Package</b>	Noryl
<b>Type</b>	Flow switch
<b>Range</b>	10 Bar @ 20°C
<b>Operating Temp</b>	-30°C to 85°C
<b>Unique Features</b>	Triac, normally open, close on flow
<b>Calibration / Accuracy</b>	N/A
<b>Dimensions (mm)</b>	106 x 32 x 32
<b>Typical Apps</b>	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-05

<b>Package</b>	Brass
<b>Type</b>	Flow switch
<b>Range</b>	10 Bar @ 20°C
<b>Operating Temp</b>	-30°C to 100°C
<b>Unique Features</b>	SPST reed switch, normally open, close on flow
<b>Calibration / Accuracy</b>	N/A
<b>Dimensions (mm)</b>	113 x 53 x 36
<b>Typical Apps</b>	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-06

<b>Package</b>	Brass
<b>Type</b>	Flow switch
<b>Range</b>	10 Bar @ 20°C
<b>Operating Temp</b>	-30°C to 100°C
<b>Unique Features</b>	Triac, normally open, close on flow
<b>Calibration / Accuracy</b>	N/A
<b>Dimensions (mm)</b>	113 x 53 x 36
<b>Typical Apps</b>	Mains water control, power shower, central heating systems, circulation pump protection, cooling systems



### FS-90/1

<b>Package</b>	Copper
<b>Type</b>	Flow switch
<b>Range</b>	10 Bar @ 20°C
<b>Operating Temp</b>	-30°C to 85°C
<b>Unique Features</b>	SPST reed switch, normally open, close on flow
<b>Calibration / Accuracy</b>	N/A
<b>Dimensions (mm)</b>	153 x 25 x 15
<b>Typical Apps</b>	Leak detection, flow sensing, mains water control, cooling systems, circulation pump protection



# Position

Measurement Specialties is a leading manufacturer of industrial linear and angular position, tilt and fluid level sensors. Both off-the-shelf and custom position sensing solutions are available featuring our core technologies including inductive, potentiometric, magneto-resistive, Hall effect, reed switch, electrolytic and capacitive sensing. Sophisticated designs and state-of-the-art manufacturing techniques provide reliable and cost effective solutions for a broad range of applications. MEAS applications range from automotive, power generation, subsea, hydraulics, medical, HVAC/R, process controls, factory automation, security systems and many other industrial areas, to the most severe environments in Military/Aerospace and Nuclear. Measurement Specialties position sensors are available with analog and digital outputs. Our comprehensive range of signal conditioning instrumentation allows us to meet the specific needs of both OEMs and end users.



## Anisotropic Magnetostrictive (or AMR) Sensor Components

### Magnetostrictive

Anisotropic magnetostrictive or AMR sensors offer robust non-contact measurement of changes in the angle of the magnetic field as seen by the sensor. This effect allows for the creation of sensors that can detect disturbance in extremely weak fields, as found in traffic detection sensors, to strong field sensors that are used in precision encoders.

						
<b>Package</b>	SOT-223, E-line 4 pin	TDFN 2.5 x 2.5	TDFN 2.5 x 2.5, SO-8	TDFN 2.5 x 2.5	Die, hybrid	TSSOP
<b>Type</b>	Linear low field sensor	Low field switch sensor	Angle sensor	Angle sensor	Linear displacement sensor	Angle sensor
<b>Range</b>	-2 to +2 kA/m magnetic field	1 to 3 kA/m magnetic switching field	180° angle	360° angle	Absolute within pole pitch, else incremental	360° angle
<b>Unique Features</b>	- High sensitivity - Low hysteresis - Linear to uniaxial field strength	- Linearized ratiometric output - Temperature compensated switching point	- High accuracy - High resolution	- High accuracy - High resolution - 360° full turn	- For pole pitch MLS-1000: p=1 mm MLS-2000: p=2 mm MLS-5000: p=5 mm	- Low cost MR encoder for rotational and incremental measurements
<b>Output</b>	Ratiometric with output voltage range 20 mV/V	Ratiometric with output voltage range 10 mV/V	Sine / cosine signals with output voltage range 20 mV/V	Three 120° phase shifted output signals with output voltage range 20 mV/V	Sine / cosine signals with output voltage range 20 mV/V	Voltage 0 - 5 V I°C Customer specific
<b>Resolution</b>	typ. 0.1% of range	typ. 0.1 kA/m	typ. 0.01° .. 0.1°	typ. 0.01° .. 0.1°	0.01% .. 0.1% of pole pitch	typ. 0.1°
<b>Accuracy</b>	typ. 1% of range	typ. 0.1 kA/m	typ. 0.1° .. 1°	typ. 0.1° .. 1°	0.1% .. 1% of pole pitch	typ. 0.3°
<b>Operating Temp</b>	-40°C to 150°C	-25°C to 85°C	-40°C to 150°C (175°C on request)	-40°C to 150°C	-40°C to 125°C	-25°C to 85°C
<b>Dimensions (mm)</b>	SOT: 6.6 x 7.0 x 1.6 E-line: 16 x 4.2 x 2.4	TDFN: 2.5 x 2.5 x 0.8	TDFN: 2.5 x 2.5 x 0.8 SO-8: 5 x 4 x 1.75	TDFN: 2.5 x 2.5 x 0.8	Die: 5.2 x 1.2 x 0.5 HK: 7.6 x 5.3 x 1.4 HS: 18 x 8 x 2	TSSOP20: 6.5 x 6.4 x 1.2
<b>Typical Apps</b>	Non-destructive material testing, spray arm detection in dish washers, magnetic imaging, brake pedal position	Piston position switch, reed switch replacement	Steering position, flow meters, rpm meters, rotary encoders	Steering position, gauge readings, rotary encoders	Roller conveyors, circular saws, bending machines etc.	Knobs, small robotics, angular / linear position

## Angular Position Transducers, Inductive

### Absolute

Measurement Specialties offers many different OEM and end-user, non-contact angular position solutions. We have a technology for virtually any automotive, industrial or mil-aero application. Absolute angular technologies include RVDT and RVIT, with outputs and packaging to match most application requirements.

			
<b>Package</b>	PCB for OEM volumes	Servo mount with ball bearing	Servo mount with ball bearing
<b>Resolution</b>	Infinite	Infinite	Infinite
<b>Excitation</b>	DC Voltage	DC symmetrical ±15 VDC	AC operated
<b>Output</b>	DC voltage , DC current , digital	±7.5 VDC	AC voltage
<b>Range</b>	Up to ±75°	±60°	±30° to ±60°
<b>Unique Features</b>	- Absolute position	- Absolute position - Low momentum of inertia	- Absolute position
<b>Operating Temp</b>	-25°C to 85°C	-25°C to 85°C	-55°C to 150°C
<b>Dimensions (mm)</b>	Custom	Aluminum case size 11 (Ø 27 mm)	Aluminum case size 11 (Ø 27 mm)
<b>Typical Apps</b>	Viscometers, valve position, robotics, HVAC vane position, ATM's, joysticks	Dancer arm position, rotary actuator position feedback, throttle lever position feedback, ballvalve position, textile manufacturing equipment, printing presses	Machine tool equipment, rotary actuator feedback, valve positioning, power generation valve position

Many other models available, Please see MEAS web site library.

## Angular Position Sensors, Encoders

Measurement Specialties designs and manufactures many absolute and incremental angular encoders based on our Magneto-Resistive and Potentiometric technology. These encoders are designed to OEM specifications or standard off-the-shelf. Outputs are either analog or digital and we also have submersible packages.

### Absolute



**ED-18**

<b>Package</b>	Medium duty with sleeve or ball bearing
<b>Resolution</b>	Analog 1.4°
<b>MAX Speed</b>	300RPM (sleeve bearing) 3000RPM (ball bearing)
<b>Excitation</b>	5 Vdc
<b>Unique Features</b>	- Low profile - Excellent stability - No optical degradation
<b>Output</b>	Voltage or current
<b>Range</b>	360°
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	25.4 x 25.4 x 33.78
<b>Typical Apps</b>	Feedback sensor or human machine interface device, servomotor position and speed control



**ED-22**

<b>Package</b>	Medium duty with sleeve bearing
<b>Resolution</b>	Analog 1.4°
<b>MAX Speed</b>	300RPM
<b>Excitation</b>	5 Vdc
<b>Unique Features</b>	- Encapsulated electronics / sealed unit - Highly resistant to vibration - No optical degradation
<b>Output</b>	Voltage
<b>Range</b>	270°
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	Ø 19.05 x 38.1
<b>Typical Apps</b>	Low-cost non-contact HMI potentiometer replacement



**R36**

<b>Package</b>	Heavy duty shaftless
<b>Resolution</b>	Analog 0.7°
<b>MAX Speed</b>	NA
<b>Excitation</b>	5 Vdc
<b>Unique Features</b>	- Rugged housing - Shaftless - No optical degradation
<b>Output</b>	Voltage
<b>Range</b>	180°
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	38.1 x 25.4 x 7.62
<b>Typical Apps</b>	Feedback sensor or human machine interface device, rudder control, servomotor position and speed control



**RT8, RT9**

<b>Package</b>	Aluminum or stainless IP67, IP68
<b>Resolution</b>	±0.15% to ±1.25%
<b>MAX Speed</b>	--
<b>Excitation</b>	--
<b>Unique Features</b>	- Absolute rotary - Designed for heavy industrial applications - CSA, CENELEC certification for hazardous area applications
<b>Output</b>	Voltage divider, 0 - 5V, 0 - 10V, 4 - 20 mA, incremental encoder, CANbus, DeviceNET
<b>Range</b>	0 - 0.125 to 0 - 200 turns
<b>Operating Temp</b>	-40°C to 90°C
<b>Dimensions (mm)</b>	Ø 65 x 100 (RT8) Ø 115 x 60 (RT9)
<b>Typical Apps</b>	Valve control, airport passenger loading bridge, water management, factory automation

### Incremental



**ED-19**

<b>Package</b>	Medium duty with sleeve or ball bearing
<b>Resolution/Accuracy</b>	1024, 400, 256 CPR (others on request)
<b>MAX Speed</b>	300 RPM (sleeve bearing) 3000 RPM (ball bearing)
<b>Excitation</b>	5 Vdc
<b>Unique Features</b>	- Sleeve or ball bearing - No optical degradation
<b>Output</b>	Quadrature (TTL level, open collector)
<b>Range</b>	360°
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	25.4 x 25.4 x 33.78
<b>Typical Apps</b>	Feedback sensor or human machine interface device, servo/stepper motor position and speed control



**ED-20**

<b>Package</b>	Medium duty with ball bearing
<b>Resolution/Accuracy</b>	1024, 400, 256 CPR (others on request)
<b>MAX Speed</b>	3000 RPM
<b>Excitation</b>	5 Vdc (NPN and LVD) 12 - 32 Vdc (HVD)
<b>Unique Features</b>	- Resistant to contamination - Metallic threaded bushing mounting - Custom housings, shafts, connectors available - No optical degradation
<b>Output</b>	Quadrature (NPN, LVD and HVD)
<b>Range</b>	360°
<b>Operating Temp</b>	-40°C to 85°C
<b>Dimensions (mm)</b>	Ø 31.75 x 33.78
<b>Typical Apps</b>	Feedback sensor or human machine interface device, servo/stepper motor position and speed control

Many other models available. Please see MEAS website library.

## Tilt Sensors

### Single Axis

Measurement Specialties offers both capacitive and electrolytic tilt sensing technology in rugged die-cast aluminum or ceramic packaging. These products are available in ranges up to  $\pm 60$  degrees and are provided with many analog as well as digital I/O options. Linearized and temp-compensated outputs are available. OEM and end-user packaging is available as well as raw sensors for high volume OEM applications.

						
	<b>E-Series</b>	<b>AccuStar®</b>	<b>APS System</b>	<b>G-Series</b>	<b>AccuStar® IP66</b>	<b>IT9000</b>
<b>Package</b>	Ceramic housing	LCP housing	Plastic housing	AL housing IP 67	AL housing IP 66	Aluminum or stainless
<b>Type</b>	Inclination sensor module	Inclination sensor module	Inclination system	Inclinometer	Inclinometer	Inclinometer
<b>Range</b>	$\pm 5^\circ, \pm 15^\circ$	$\pm 45^\circ$ to $\pm 60^\circ$	$\pm 20^\circ, \pm 45^\circ, \pm 90^\circ$	$\pm 10^\circ$	$\pm 3^\circ$ to $\pm 45^\circ$	$\pm 45^\circ$ to $\pm 240^\circ$
<b>Output</b>	Voltage	Voltage	Analogue / digital	Switch	Current	Voltage divider, 4 - 20 mA
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Easy to handle</li> <li>- Minimal temperature drift</li> <li>- Good long term stability</li> </ul>	<ul style="list-style-type: none"> <li>- Compact</li> <li>- Low power</li> <li>- Vertical and horizontal mount</li> </ul>	<ul style="list-style-type: none"> <li>- Stand alone system</li> <li>- Separate system and sensor</li> </ul>	<ul style="list-style-type: none"> <li>- Programmable</li> <li>- EMC standard</li> <li>- High switch accuracy</li> </ul>	<ul style="list-style-type: none"> <li>- EMI + RFI rated</li> <li>- CE pending</li> <li>- Water tight enclosure</li> </ul>	<ul style="list-style-type: none"> <li>- Rugged industrial design, IP67 / 68</li> <li>- Submersible</li> <li>- Designed for brutal environments</li> <li>- CSA, CENELEC certification for hazardous area applications</li> </ul>
<b>Accuracy</b>	$\pm 0.2^\circ$ to $\pm 0.5^\circ$	0° to 10° $\pm 0.1\%$ accuracy 10° to 45° $\pm 1\%$ of reading	0° to 10° $\pm 0.1\%$ accuracy 10° to 45° $\pm 1\%$ of reading	$\pm 0.25^\circ$	0° to 10° $\pm 0.1\%$ linearity 10° to 45° $\pm 1\%$ linearity	$\pm 0.04\%$ to $\pm 0.25\%$
<b>Operating Temp</b>	-25°C to 85°C	-30°C to 65°C	-25°C to 65°C	-25°C to 85°C	-25°C to 60°C	-34°C to 90°C
<b>Dimensions (mm)</b>	29 x 17 x 16.5	65.91 x 51.56 x 30.5	127.5 x 88 x 32.2	80 x 75 x 57.5	98.04 x 63 x 35.05	$\varnothing$ 130 x 100
<b>Typical Apps</b>	Road construction, building monitoring, weighing systems, mobile and stationary cranes, platform leveling	Wheel alignment, construction, equipment, antenna positioning, robotics, crane / boom angle	Tower crane safety, RV and mobile trailer leveling, water and oil well drilling rigs, mining equipment	Lift platforms, building device control, train inclination monitoring, position switch	Tower crane safety, RV and mobile trailer leveling, water and oil well drilling rigs, mining equipment	Waste water control, tainter gates, draw bridges, heavy industrial applications

### Dual Axis

All of the same features of the Measurement Specialties single axis sensors and modules in a dual axis package.

				
	<b>DPL/DPN-Series</b>	<b>DOG2-Series</b>	<b>DPG-Series</b>	<b>D-Series</b>
<b>Package</b>	PCB board	Plastic PA 6.6 housing, IP 67	AL housing IP 67	AL housing IP 67
<b>Type</b>	Inclination board module	Inclinometer	Inclinometer	Inclinometer
<b>Range</b>	$\pm 2^\circ$ to $\pm 30^\circ$	$\pm 25^\circ, \pm 45^\circ, \pm 90^\circ$	$\pm 5^\circ$ to $\pm 30^\circ$	$\pm 5^\circ$ to $\pm 30^\circ$
<b>Output</b>	Voltage / RS 232 / SPI	Voltage	RS232 / Voltage	RS232 / Voltage / Current / Switch / PWM / CAN open
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- High resolution</li> <li>- Minimal temperature drift</li> <li>- User configurable</li> </ul>	<ul style="list-style-type: none"> <li>- Plug &amp; play</li> <li>- Wide measurement range</li> <li>- Cost-efficient</li> <li>- Cable out w. Tyco Ampseal 1.5 4pos connector</li> <li>- Fast MEMS sensor</li> </ul>	<ul style="list-style-type: none"> <li>- CE approved</li> <li>- Rugged housing</li> <li>- Easy to use</li> <li>- User configurable</li> </ul>	<ul style="list-style-type: none"> <li>- High accuracy</li> <li>- Rugged housing</li> <li>- Programmable</li> <li>- CE approved</li> </ul>
<b>Accuracy</b>	$\pm 0.05^\circ$ to $\pm 0.8^\circ$	$< \pm 0.5^\circ$ (full temp. range)	$\pm 0.3^\circ$	$\pm 0.04^\circ$ to $\pm 0.8^\circ$
<b>Operating Temp</b>	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
<b>Dimensions (mm)</b>	45 x 45 x 14	70.5 x 45 x 15	84 x 70 x 30.2	84 x 70 x 46
<b>Typical Apps</b>	Laser leveling, weighing systems, mobile and stationary cranes, hydraulic leveling, building monitoring, wind power	Off-road vehicle, fork lift, truck leveling, man lift, harvester, farm machine, tip over protection, solar panel control	Platform leveling, road construction machines, tunnel drilling, mobile leveling	Drilling machines, mobile and stationary cranes, wind power, antenna / radar leveling

NEW

## Proximity Magnet

### Proximity Magnet for Use with Proximity Sensors

				
<b>Package</b>	PM101	PM50	PM81	PM83
<b>Type</b>	Glass filled nylon 6.6	Glass filled nylon 6.6	Nylon 6.6	Stainless steel
<b>Unique Features</b>	Proximity magnet	Proximity magnet	Proximity magnet	Proximity magnet
<b>Operating Temp</b>	Housed magnet	Housed magnet	Housed magnet	Housed magnet
<b>Dimensions (mm)</b>	-30°C to 105°C	-30°C to 70°C	-30°C to 120°C	-30°C to 120°C
<b>Typical Apps</b>	29 x 7 x 20	Ø 6 x 32	Ø 10 x 38	Ø 12 x 32
	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication

## Proximity Sensors

### Proximity Sensing When Used with a Proximity Magnet

							
<b>Package</b>	PS2011AB	PS2021AB	PS2031AB	PS501	PS801	PS811	PS831
<b>Type</b>	Glass filled nylon 6.6	Stainless steel	Nylon 6.6	Stainless steel			
<b>Unique Features</b>	Proximity sensor						
<b>Operating Temp</b>	SPST reed switch, normally open	SPST reed switch, normally closed	SPDT reed switch	SPST reed switch, normally open			
<b>Dimensions (mm)</b>	-30°C to 105°C	-30°C to 105°C	-30°C to 105°C	-30°C to 130°C	-30°C to 120°C	-30°C to 110°C	-30°C to 130°C
<b>Typical Apps</b>	29 x 7 x 20	29 x 7 x 20	29 x 7 x 20	Ø 6 x 32	Ø 12 x 65	Ø 10 x 38	Ø 12 x 32
	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication	Door interlocks, hook switches, security systems, safety interlocks, position indication

# Linear Position Transducers

**NEW**

## Cable Extension Transducers

Commonly called stringpots or draw-wire sensors, cable extension transducers provide a linear position feedback signal for both short and long stroke measurement ranges. These sensors have been designed to provide the utmost in flexibility, long life and high accuracy. The benefits of string pots are that they are easy to install, don't require precise alignment and the retractable spring loaded measuring eliminates the need for the extra space required by most rod-type position sensors.



**M150, MTA**



**MT2, MT3**



**SM, SP**



**SG, SR**



**Z115, Z250**

<b>Range</b>	0 - 1.5 to 0 - 5 inches	0 - 3 to 0 - 30 inches	0 - 2.5 to 0 - 50 inches	0 - 80 to 0 - 175 inches	0 - 100 to 0 - 2400 mm
<b>Output</b>	Voltage divider	Voltage divider, incremental encoder	Voltage divider, 0 - 10 Vdc, 4 - 20 mA	Voltage divider, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA, incremental encoder, CANbus	Voltage divider
<b>Environment / IP Rating</b>	IP50	IP50, IP67 (MT3A)	IP50	IP67	IP50
<b>Enclosure</b>	Aluminum	Aluminum and polycarbonate	Polycarbonate with stainless steel bracket	Polycarbonate with stainless steel bracket	Aluminum
<b>Accuracy</b>	±0.4% to ±1%	±0.25% to ±1.1%	±0.25% to ±1%	±0.35% to ±0.5%	±0.15% to ±0.25%
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- M150, world's smallest stringpot</li> <li>- Designed for space-critical and testing applications</li> </ul>	<ul style="list-style-type: none"> <li>- Designed for test applications</li> <li>- Dual-axis measuring cable alignment</li> <li>- Tracks high-acceleration linear position up to 136g's</li> <li>- High-frequency response</li> <li>- GAM EG 13 certification</li> </ul>	<ul style="list-style-type: none"> <li>- In stock</li> <li>- Compact design</li> <li>- Low cost, high value stringpot</li> <li>- Versatile stainless steel mounting bracket</li> <li>- Free-release tolerant</li> <li>- Custom configurations available for OEM customers</li> </ul>	<ul style="list-style-type: none"> <li>- In stock</li> <li>- Low cost, high value stringpot</li> <li>- Versatile stainless steel mounting bracket</li> <li>- Simple one-button user scalable stroke range (SR)</li> <li>- Custom configurations available for OEM customers</li> </ul>	<ul style="list-style-type: none"> <li>- Customer specific for OEM applications</li> <li>- Short design time</li> <li>- Fast turnaround</li> <li>- Cost effective</li> <li>- Contact factory for more information</li> </ul>
<b>Operating Temp</b>	-40°C to 85°C (M150) -55°C to 100°C (MTA)	-55°C to 125°C	-18°C to 70°C	-40°C to 85°C	Design specific
<b>Dimensions (mm)</b>	19 x 19 x 10 (M150)	55 x 45 x 55	43 x 45 x 68	100 x 120 x 200	Design specific
<b>Typical Apps</b>	Aerospace, automotive instrumentation, crash testing, auto and motorcycle racing	Automotive crash testing, aerospace and flight testing	Factory automation, light industrial, seismic testing, racing instrumentation, medical imaging systems, fume hood position	Outdoor mobile construction equipment, outrigger positioning, hydraulic lifts, water and power controls	Vehicle lift systems, medical imaging systems including x-ray, mammography, CT's and oncology devices, fume hood and HVAC controls.



**PTX, PT101**



**PT1, PT5**



**PT8000**



**PT9000**

<b>Range</b>	0 - 2 to 0 - 100 inches	0 - 2 to 0 - 250 inches	0 - 2 to 0 - 60 inches	0 - 75 to 0 - 1700 inches
<b>Output</b>	Voltage divider, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA, incremental encoder, velocity output (DV301)	Voltage divider, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA, incremental encoder, CANbus, DeviceNET, RS-232	Voltage divider, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA, incremental / absolute encoder, CANbus, DeviceNET, RS-232	Voltage divider, 0 - 5 Vdc, 0 - 10 Vdc, 4 - 20 mA, incremental / absolute encoder, CANbus, DeviceNET, RS-232
<b>IP Rating</b>	IP50	IP65, IP67 (PT5)	IP67, IP68	IP67, IP68
<b>Enclosure</b>	Aluminum	Aluminum and abs plastic (PT1)	Aluminum or stainless	Aluminum or stainless
<b>Accuracy</b>	±0.04% to ±0.25%	±0.04% to ±0.25%	±0.04% to ±0.25%	±0.04% to ±0.25%
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Original classic design</li> <li>- High precision</li> <li>- Proven track record</li> </ul>	<ul style="list-style-type: none"> <li>- Designed for most factory environments</li> <li>- Industry standard output signals</li> <li>- User serviceable</li> <li>- Compact design (PT1)</li> </ul>	<ul style="list-style-type: none"> <li>- Heavy duty, submersible</li> <li>- Designed for extreme industrial and marine environments</li> <li>- CSA, CENELEC certification for hazardous area applications</li> <li>- High accuracy, high acceleration</li> <li>- Free-release proof with VLS option</li> <li>- M12 and Deutsch connector options</li> </ul>	<ul style="list-style-type: none"> <li>- Heavy duty, submersible</li> <li>- Proven workhorse for long stroke applications</li> <li>- Designed for extreme industrial and marine environments</li> <li>- CSA, CENELEC certification for hazardous area applications</li> <li>- Free-release proof with VLS option</li> <li>- M12 and Deutsch connector options</li> </ul>
<b>Operating Temp</b>	-40°C to 90°C	-40°C to 90°C	-40°C to 90°C	-40°C to 90°C
<b>Dimensions (mm)</b>	Model and range specific	85 x 100 x 70 (PT1) 100 x 175 x 80 (PT5)	90 x 140 x 135	200 x 135 x 125
<b>Typical Apps</b>	Aerospace testing, architectural and structural testing, factory automation	Factory automation, industrial, die casting, injection molding	Steel mills, lumber and paper mills, factory automation, die-casting, injection molding, mobile construction and mining	Mobile hydraulic boom position, water resource management, mining and tunnel boring equipment, telescoping mechanism position, theatre stage control.

## Linear Position Transducers

### Absolute

Linear absolute technologies include LVDT's for OEM and end-user applications and LCIT's for low-cost OEM requirements. All of these sensors feature friction-free, non-contact inductive magnetic coupling for extremely long cycle life and virtually infinite resolution. Various off-the-shelf and custom packaging options are available for the most demanding application requirements.

						
	<b>HR</b>	<b>M12</b>	<b>HC</b>	<b>XS-C</b>	<b>DC-SE</b>	<b>XS-D</b>
<b>Package</b>	AISI-400 Series Stainless steel	AISI-304 Series Stainless steel	AISI-400 Series Stainless steel	AISI-304 Series Stainless steel	AISI-400 Series Stainless steel	AISI-400 Series Stainless steel
<b>Linearity</b>	±0.25% of range	±0.25% of range	±0.25% of range	±0.25% of range	±0.25% of range	±2% of range
<b>Excitation</b>	AC operated	AC operated	AC and DC operated versions	AC operated	8.5 to 28 VDC	AC operated
<b>Output</b>	AC voltage	AC voltage	AC or DC voltage, 4 - 20 mA loop or RS-485	AC voltage	0 - 5 VDC (4 wire) 1 - 6 VDC (3 wire)	AC voltage
<b>Range</b>	±0.05 to ±10 inches	±10 to ±100 mm	±0.05 to ±10 inches	±0.25, ±0.5 & ±1 inch	0 - 0.1 to 0 - 6 inches	±1 to ±10 inches
<b>Unique Features</b>	- Large bore to core clearance - Broad range of excitation frequencies - Many options - Mild radiation resistance option	- Metric series - High stroke to length ratio - Constant sum of secondaries - Excellent temperature coefficient	- Hermetically sealed - Welded connector - Double shielding - Intrinsically safe version - CE mark for DC versions	- High pressure - Bulkhead mounting - Hermetically sealed welded assembly	- CE mark - Low current consumption (6 mA typical) - Synchronous demodulation - Shielded cable	- Very high stroke to body length ratio
<b>Operating Temp</b>	-55°C to 150°C (220°C optional)	-55°C to 150°C (220°C optional)	-55°C to 150°C (AC); 0°C to 70°C (DC)	-55°C to 150°C	-25°C to 85°C	-55°C to 150°C
<b>Diameter (mm)</b>	20.6	12	19	19	19	20.6
<b>Typical Apps</b>	General industrial	Hydraulic spool valve position feedback, flight simulators, aircraft flight control feedback	Harsh environments, submersible applications, process controls, valve position feedback	Hydraulic actuators, other pressurized vessels	Positioning sensing feedback, battery operated systems, test labs, ram guide, platen position	Where sensor installation length is restricted, ideal replacement for linear potentiometers

Many other models available. Please see MEAS website library.

### Dimensional Gauging Products

Gage heads are spring loaded or air actuated position sensors (LVDTs) with contact tips. Our precision gauge heads are classified into several categories based on size, repeatability, accuracy and input/output.

					
	<b>LBB, spring-extend</b>	<b>LBB air-extend</b>	<b>PCA 375</b>	<b>GC</b>	<b>Ultimate-Precision Digital LBB</b>
<b>Linearity</b>	±0.2% of range	±0.2% of range	±0.5% of range	±0.25% (Voltage) to ±0.5% (4 - 20 mA) of range	Accuracy ±0.2%
<b>Excitation</b>	AC operated	AC operated	AC operated	AC or DC voltage	5 VDC USB (bus or external)
<b>Output</b>	AC voltage	AC voltage	AC voltage	AC or DC voltage, RS-485, or 4 - 20 mA loop	RS485 Orbit® compatible; USB
<b>Range</b>	±0.02 to ±0.20 inch	±0.04 & ±0.1 inch	±0.02 to ±1 inch	±0.05 to ±2 inches	1, 2, 5 and 10 mm
<b>Unique Features</b>	- 0.000004 inch (0.1 µm) repeatability - Removable tungsten carbide contact tip - Double shielded LVDT - Repairable	- 0.000004 inch (0.1 µm) repeatability - Removable tungsten carbide contact tip - Double shielded LVDT - Repairable	- Longer strokes - IP65 cable exit - Accepts industry standard contact tips - Heavy duty return spring	- Hermetically sealed - Welded MS connector (MIL-C-5015) - CE mark for DC Versions - Special tips available - Air extend spring retract available	- Plug-and-play compatible with Orbit® bus - 14-bit resolution - COM libraries provided - CE mark - USB adapter and power supply available
<b>Operating Temp</b>	-40°C to 70°C	-40°C to 70°C	-20°C to 70°C	-55°C to 150°C (AC); 0°C to 70°C (DC)	0°C to 60°C
<b>Diameter (mm)</b>	8 or 9.5	8 or 9.5	9.5	19 mm body, 1/2 - 20 threads	Stackable gage system
<b>Typical Apps</b>	Process standards, manufacturing on-line inspection, robotics, replaces dial indicators in manual measurement systems	Process standards, manufacturing on-line inspection, robotics, replaces dial indicators in manual measurement systems	High density gaging fixtures, resistance weld verification, pressing applications, X-Y stage position feedback, rough casting inspection	Harsh environments, environments requiring hermetic seal, high temperatures (150°C for AC units)	Multi-channel electronic dimensional gauging, precision dimensional measurement, optics inspection systems, SPC data collection, hand tools

Many other models available. Please see MEAS web site library. Orbit® is a registered trademark of Solartron Metrology.

## Linear Position Sensors

### Incremental

Linear incremental encoders provide rugged low cost, non-contacting position feedback for demanding applications. This technology is not affected by dirt, oil, dust or other contaminants. It is also not affected by changes in ambient lighting conditions.



**ED32i**

<b>Package</b>	IP67 aluminum
<b>Range</b>	Magnetic scale, 5mm pole pitch, typically up to 100 m absolute version up to 100 mm range on request
<b>Excitation</b>	5 VDC
<b>Output</b>	5 V TTL ABZ differential quadrature; RS-485
<b>Resolution</b>	Resolution: $\geq 10 \mu\text{m}$ ; field programmable
<b>Maximum Speed</b>	4 m/s
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Contactless incremental measurement</li> <li>- Very high accuracy, programmable resolution</li> <li>- High speed up to 4 m/s</li> <li>- Error detection, missing scale function</li> <li>- Adapter plate for easy mounting</li> </ul>
<b>Operating Temp</b>	-25°C to 85°C
<b>Dimensions (mm)</b>	60 x 20 x 10
<b>Typical Apps</b>	Linear displacement measurement in industrial and medical applications

### Linear Potentiometers



**MLP, CLP**

Aluminum body, steel rod, IP65 / 67
0 - 0.5 to 0 - 11.5 inches
Up to 40 VDC max.
Voltage divider
$\pm 0.1\%$ to 0.5%
10 m/s
<ul style="list-style-type: none"> <li>- Extended temperature range, miniature design</li> <li>- First choice for auto racing applications</li> <li>- Perfect for high cycle applications</li> </ul>
-40°C to 90°C
diameter / cross section: $\varnothing 9.5 \text{ mm}$ (MLP), 15 mm x 15 mm (CLP)
Vehicle testing, autosport instrumentation, structural and architectural testing and robotics.

## LVDT / RVDT Instrumentation

Our OEM and end-user oriented LVDT/RVDT instrumentation signal conditioners and read-out devices are specifically designed to be compatible with all our Linear and Angular AC inductive sensors. These instruments provide everything needed to interface with our AC devices to control or data acquisition systems.



**LVM-110 LiM-420**



**LDM-1000**



**ATA-2001**



**PML 1000**



**MP 2000**

<b>Package</b>	Open circuit board	DIN rail mount	1/8 DIN panel mount	1/8 DIN panel mount	1/4 DIN panel mount
<b>Supply</b>	DC voltage	10 to 30 VDC	115 and 220 VAC, 50 - 400 Hz	90 to 265 VAC, 50 - 60 Hz or 24 VDC	100 to 240 VAC, 47 - 63 Hz
<b>Output</b>	DC voltage or current	DC voltage and current	DC voltage and current	DC voltage and current (RS-485 optional)	DC voltage and RS-232
<b>Operating Temp</b>	0°C to 55°C	-25°C to 85°C	-40°C to 85°C	10°C to 55°C	0°C to 55°C
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Master / slave for multi-up applications</li> <li>- Dip switch selectable excitation frequencies</li> <li>- Plug-in PCB or wire termination</li> <li>- Small form factor</li> </ul>	<ul style="list-style-type: none"> <li>- Operates with 4, 5 &amp; 6 wire LVDT / RVDTs</li> <li>- Adjustable zero, span and phase</li> <li>- Status LEDs</li> <li>- CE mark</li> </ul>	<ul style="list-style-type: none"> <li>- Push button programmable</li> <li>- Splash proof front panel</li> <li>- LED status lights</li> <li>- Mounting hardware included</li> <li>- CE mark</li> </ul>	<ul style="list-style-type: none"> <li>- 5 digit LED display</li> <li>- Auto-calibration</li> <li>- Programmable</li> <li>- Splash proof front panel</li> <li>- Mounting hardware included</li> <li>- CE mark</li> </ul>	<ul style="list-style-type: none"> <li>- Programmable set point controller</li> <li>- Dual channel with math functions</li> <li>- Digital I/O</li> <li>- Large LCD display</li> <li>- Splash proof front panel</li> </ul>
<b>Dimensions (mm)</b>	63 x 56 x 21	115 x 99 x 23	267 x 99 x 49	173 x 97 x 49	178 x 92 x 92
<b>Typical Apps</b>	OEM applications	Automotive test track instrumentation, gas and steam turbine controls, factory automation	Precision metrology labs, power generation valve position monitoring	Remote monitoring stations, measurement test stands, process monitoring	LVDT based weighing systems, pass / fail parts sorting, quality inspection

Solutions by Sensor Type:

Liquid Level

Measurement Specialties' range of liquid level products addresses the sensing requirements of the construction, off-road, automotive industries. Our solutions include level sensors for power steering, coolant, windscreen wash, fuel and oil. We pride ourselves on our experience in serving the heavy duty vehicle markets: Truck and Bus, Emergency, Military, Recreational, Luxury and Coach.

We also offer level sensors for use in demanding applications such as storage and collection tanks, vending machines, showers for the disabled, heat exchangers, washing machines, central heating systems and boilers.

To meet the requirements of the food and beverage industry, MEAS offers a range of standard products which provide cost-effective solutions. We also provide thousands of sensors annually to marine engine manufacturers.

For complex OEM applications, we work closely with customers to ensure the appropriate sensing solution is delivered.



## Liquid Level Sensors

### High or Low Level Sensing

NEW



**LS304-31**

**Package** Glass filled nylon 6.6  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 130°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Chemical high or low level, diesel fuel, fuel low level, alcohols, low oil detection



**LS304-51N**

**Package** Glass filled nylon 6.6  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 130°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Chemical high or low level, diesel fuel, fuel low level, alcohols, low oil detection



**LS309-31**

**Package** Glass filled nylon 6.6  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 130°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Chemical high or low level, diesel fuel, fuel low level, alcohols, low oil detection



**LS309-51N**

**Package** Glass filled nylon 6.6  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 130°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Chemical high or low level, diesel fuel, fuel low level, alcohols, low oil detection



**LS504-31**

**Package** Glass filled PPS  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 110°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Coolant level indication, water high or low level, boiler heating element protection, drinking water level, boiling water



**LS504-51**

**Package** Glass filled PPS  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 110°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Coolant level indication, water high or low level, boiler heating element protection, drinking water level, boiling water



**LS509-31**

**Package** Glass filled PPS  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 110°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Coolant level indication, water high or low level, boiler heating element protection, drinking water level, boiling water



**LS509-51**

**Package** Glass filled PPS  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 110°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Coolant level indication, water high or low level, boiler heating element protection, drinking water level, boiling water



**LS804-31**

**Package** Glass filled polypropylene  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 105°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Continuous 80°C in water, water high or low level, condensate level alarm, drinking water level, cooling systems



**LS804-51**

**Package** Glass filled polypropylene  
**Type** Level sensor  
**Unique Features** SPDT reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 105°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Continuous 80°C in water, water high or low level, condensate level alarm, drinking water level, cooling systems



**LS809-31**

**Package** Glass filled polypropylene  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 2.0 bar  
**Operating Temp** -30°C to 105°C  
**Dimensions (mm)** 103 x 29 x 29  
**Typical Apps** Continuous 80°C in water, water high or low level, condensate level alarm, drinking water level, cooling systems



**LS809-51**

**Package** Glass filled polypropylene  
**Type** Level sensor  
**Unique Features** SPST reed switch  
**Max. Pressure** 4.7 bar  
**Operating Temp** -30°C to 105°C  
**Dimensions (mm)** 88 x 27 x 27  
**Typical Apps** Continuous 80°C in water, water high or low level, condensate level alarm, drinking water level, cooling systems

Measurement Specialties' range of level sensors is now expanded to include sensors using Ultrasonic Technology.

Using ultrasonic technology opens a wider variety of applications where liquid level needs to be measured despite transparency, viscosity, color or dielectric. Our ultrasonic sensors are deployed in numerous applications including, air bubble detection in as small as 1mm tube, contact and non-contact and high accuracy for container fill verification through air and liquid, 316L stainless steel sensor material construction for pump protection and non-invasive solutions for pipeline fluid/type detection.

To meet the requirements of our customer's level applications, MEAS offers a range of standard products which provide a system with no moving parts, no adjustments, no maintenance, robust and cost-effective reliable level sensing solution. With ranges in temperature from -240°C to 288°C, pressures to 1000 psi, various input/output configurations and multiple sensing points. MEAS also provide sensors annually for custom complex OEM applications and work closely with our customers to insure the appropriate sensing solution is delivered.

Please visit our website or call us for the special point level and custom sensors.



## Ultrasonic Sensors

### Standard Contact Point Level

**NEW**



**LL-01**

Type Gap

**Unique Features**

- All 316L SS
- Integral electronics
- Miniature threads
- Single machined
- No adjustment for viscosity, density

Input 6 - 24VDC

Output 1/2A contact

Pressure 250 psi

Temperature 100°C

Actuation point 0.25"

Process Connection 1/4"NPT & 1/2"NPT

Cable 12"

Approvals CE

**Typical Apps**

Medical waste tanks, histology processors, compressors, chillers, coolant reservoirs



**LL-10**

Type Tip

- All 316L SS
- Integral electronics
- No adjustment for viscosity, density

Input 9 - 24VDC

Output 1A SPDT

Pressure 1000 psi

Temperature 100°C

Actuation point 2.25" standard

Process Connection 3/4"NPT

Cable 12"

Approvals CE

Hydraulic reservoirs, storage tanks, pipe lines, sewage systems



**LL-100**

Type Tip

- All 316L SS
- Integral electronics
- No adjustment for viscosity, density

Input DC and AC options

Output 10A DPDT or analog

Pressure 1000 psi

Temperature 150°C

Actuation point Custom

Process Connection 3/4"NPT

Cable Terminal block

Approvals FM, CSA, CE

Industrial tanks, pump protection, hydraulic supply lines, storage tanks



**LL-101**

Type Gap

- High / normal fail-safe
- Integral electronics
- Plastic for chemical compatibility
- No adjustment for viscosity, density
- Demand self-test

Input DC and AC options

Output 10A DPDT

Pressure 1000 psi

Temperature 150°C

Actuation point Custom

Process Connection 3/4"NPT

Cable Terminal block

Approvals FM, CSA, CE

Food processing tank, chemical tanks, oil & fuel level, liquid pharmaceuticals



**LL-104**

Type Gap

- Integral electronics
- Plastic for chemical compatibility
- No adjustment for viscosity, density

Input DC and AC options

Output Analog (4 - 20 mA)

Pressure 1000 psi

Temperature 150°C

Actuation point Custom

Process Connection 3/4"NPT

Cable Terminal block

Approvals FM, CSA, CE

Unstable chemicals, oil & fuel level, flammable liquids

# Ultrasonic Sensors

**NEW**

## Air-Bubble and Non-Invasive Point Level



**AD-101**



**SL-630**



**SE-600**



**SL-611**

<b>Type</b>	Non-invasive	Non-invasive	Non-invasive	Non-invasive
<b>Unique Features</b>	- Bubble detection from 1mm tube - Temperature option - Occlusion option - Fluid differentiation - 3.3 & 5 V input option	- Stick on dry contact - Flange mount - Point level detection	- Metal tubing - Up to 0.75" thick - Air-in-line detection	- Metal tubing - Multiple points - Air-in-line detection
<b>Input</b>	6 - 24 VDC standard	6 - 24 VDC	DC and AC options	DC and AC options
<b>Output</b>	Open collector	Open collector	5 A SPDT	1/2 A contact
<b>Pressure</b>	--	--	--	--
<b>Temperature</b>	--	70°C	82°C	82°C
<b>Actuation point</b>	--	Variable	Variable	Variable
<b>Process Connection</b>	--	Reusable sensor Disposable tape	Clamp-on	Clamp-on
<b>Cable</b>	12"	12"	10'	10'
<b>Approvals</b>	CE	CE	--	--
<b>Typical Apps</b>	Infusion pumps, dialysis machines, apheresis, auto-transfusion	Chromatography, chemical analyzer, hemodialysis, reagent vessels	Process control lines, alarm in sight glass, heating / HVAC, factory automation	Semiconductor lines, metal tubing apps, chemical flow lines, HVAC systems

## Continuous Level



**2 Wire**



**4 Wire**



**LL-1101**



**SL-700**



**ML Series**

<b>Type</b>	Continuous transmitter through air	Continuous transmitter through air	Continuous transmitter through air	Continuous transmitter through liquid	Continuous transmitter through air
<b>Unique Features</b>	- Non-contact - Integral electronics - Explosion proof - 316 SS or Tefzel sensor material - BCD switch program	- Non-contact - Integral electronics - Explosion proof - 316 SS or Tefzel sensor material - BCD switch program	- Non-contact - Remotely mounted - 316 SS or Tefzel sensor material - Push button program	- Contact / non-invasive - Remotely mounted - 316 SS sensor - RS-232 program	- Non-contact - Remotely mounted - 316 SS or Epoxy sensor material - RS-232 program
<b>Input</b>	18 - 30 VDC	24 VDC	DC and AC options	24 VDC	24 VDC
<b>Output</b>	Loop power, 4 - 20 mA	4 - 20 mA isolated	Analog, display, relay setpoints	RS-232, analog, relay setpoints	RS-232, analog, relay setpoints
<b>Pressure</b>	100 psi	100 psi	100 psi	250 psi	Atmosphere
<b>Temperature</b>	82°C	82°C	82°C	100°C	40°C
<b>Sensing Range</b>	6" to 120" - 3/4"NPT 12" to 300" - 2" NPT	6" to 120" - 3/4"NPT 12" to 300" - 2" NPT	6" to 120" - 3/4"NPT 12" to 360" - 2" NPT	Range up to 36"	Range up to 6"
<b>Process Connection</b>	3/4"NPT, 2"NPT	3/4"NPT, 2"NPT	3/4"NPT, 2"NPT	--	--
<b>Accuracy</b>	1/4% of full scale	1/4% of full scale	1/4% of full scale	± 0.005"	± 0.0005"
<b>Elect Connection</b>	Terminal block	Terminal block	Terminal block	Terminal block	Terminal block
<b>Approvals</b>	CSA, CE	CSA, CE	CE	--	--
<b>Typical Apps</b>	Liquid level monitoring, unstable chemicals, fuel storage tanks, flammable liquids	Food processing, pharmaceutical tanks, high purity fluid tanks, chemical storage	Large storage tanks, factory automation, process control tanks, power plants	Semiconductor tanks, ampoules & bubblers, high purity fluids, level in vacuum	Microplate well level, test tubes & vials, bottle fill level, surface flaw detection

Measurement Specialties brings more than twenty years experience in the design and manufacture of accelerometers and vibration sensors based on our proprietary Micro-ElectroMechanical System (MEMS), bonded gage and piezoelectric ceramic/film technologies.

Voltage mode piezoelectric is the most popular accelerometer design due to its high level output and its wide bandwidth. We offer voltage mode accelerometers in the traditional 3-wire or 2-wire (IEPE) configurations. Charge mode piezoelectric accelerometers are designed for measuring shock and vibration in high temperature environments. In addition to its high temperature operating capability when used with a high quality charge amplifier, a charge mode accelerometer offers its users unmatched dynamic range scalability. To measure motion (velocity, displacement) accurately, an accelerometer with DC response is required. Incorporating state-of-the-art MEMS technologies and the latest analog and digital ASICs, Measurement Specialties' DC accelerometers offer the best-in-class performance and exceptional value.

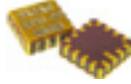


## MEMS DC Accelerometers

CE, RoHS, EAR99 Compliant

### Embedded

Uses patented piezoresistive silicon die technology with high over-range protection and broad frequency response.

							
<b>Package</b>	3022	3052	3031	3038	3038	EGHS-M	3255A
<b>Type</b>	Pins or pads	Pins or pads	SMD	SMD	SMD	SMD	SMD
<b>F.S. Range (g)</b>	Board level	Board level	Board level				
<b>Unique Features</b>	±2, 5, 10, 20, 50, 100, 200	±2, 5, 10, 20, 50, 100	±50, 100	±50, 100, 200, 500, 2000, 6000	±30K, 60K	±25, 50, 100, 250, 500	±2.5% Non-linearity
<b>Accuracy</b>	- mV output - Gas damping - Pin or pad option	- Temperature compensated - Gas damping - Pin or pad option	- Miniature DC response - Gas damping - Low power consumption	- Hermetically sealed - High over-range protection - Gas damping	- Low power - Hermetically sealed - >200 kHz resonant frequency	- Self test enabled - Gas damping - Bi-directional mounting	
<b>Operating Temp</b>	±0.5% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity	±2.0% Non-linearity	±1.0% Non-linearity	
<b>Dimensions (mm)</b>	-40°C to 125°C	-40°C to 125°C	-40°C to 125°C	-54°C to 125°C	-55°C to 125°C	-40°C to 125°C	
<b>Typical Apps</b>	22.86 x 15.24 x 5.33	22.86 x 15.24 x 5.33	7.62 x 7.62 x 3.18	7.62 x 7.62 x 3.3	6.35 x 6.35 x 1.78	13.46 x 7.62 x 3.81	
	Vibration / shock monitoring, tilt applications, motion control, impact testing	Vibration / shock monitoring, tilt applications, motion control, impact testing	Vibration / shock monitoring systems, motion control, impact testing	Vibration / shock monitoring, embedded systems, shock testing, safe and arm	Impact and shock testing, fuzing, safe and arming	Vibration / shock monitoring, aerospace testing, impact testing, transportation	

## Piezoelectric Accelerometers

### Embedded Single Axis

Uses piezo-electric technology with broad frequency response for harsh applications.

### Embedded Triaxial

					
<b>Package</b>	805/805M1	808/808M1	LDT Family	832/832M1	834/834M1
<b>Type</b>	TO - 5	TO - 8	Piezo Film elements with or without mass and pins	SMD	SMD
<b>F.S. Range (g)</b>	Adhesive (Stud mount option)	Adhesive (Stud mount option)	Cantilever beam with vertical or horizontal pins	Board mount	Board mount
<b>Unique Features</b>	±50, 500 / ±20, 200	±10, 50 / ±4, 20	±10 (typical)	±25, 50, 100, 200, 500	±2000, 6000
<b>Accuracy</b>	- Hermetically sealed - Case grounded design - Bandwidth to 12 kHz	- Hermetically sealed - Case grounded design - Bandwidth to 8 kHz	- Very low cost - High sensitivity (1V/g) - Ultra-low power (self generating)	- Low cost - Hermetically sealed - Piezo-ceramic	- Low cost - Hermetically sealed - Piezo-ceramic
<b>Operating Temp</b>	±1% Non-linearity	±1% Non-linearity	±20% (typical)	±2% Non-linearity	±2% Non-linearity
<b>Dimensions (mm)</b>	-50°C to 100°C	-50°C to 100°C	-40°C to 70°C	-20°C to 80°C / -40°C to 125°C	-20°C to 80°C / -40°C to 125°C
<b>Typical Apps</b>	∅ 8.9 x 10.16	∅ 15.2 x 16.6	19.05 x 6.35 x 6.35	18.8 x 14.22 x 4.32	18.8 x 14.22 x 4.32
	Machine monitoring, data loggers, permanent structures	Machine monitoring, data loggers, embedded applications	Wake-up switch, load imbalance, anti-theft devices, impact sensing, vital signs monitoring	Data logging, asset monitoring, impact monitoring	Data logging, asset monitoring, impact monitoring

## DC Accelerometers

CE, RoHS, EAR99 Compliant

### Plug and Play, Unamplified

Uses piezoresistive MEMS technology with high over-range protection and application-specific packaging.

	 <b>40A/40B</b>	 <b>52F</b>	 <b>52/52M30</b>	 <b>64B/64C</b>	 <b>58</b>	 <b>1201/1201F</b>
<b>Package</b>	Anodized aluminum	Anodized aluminum	Plastic / anodized aluminum	Anodized aluminum	Anodized Aluminum	Anodized aluminum
<b>Type</b>	Screw mount	Screw mount	Adhesive mount	Screw mount	Adhesive mount	Adhesive / screw mount
<b>F.S. Range (g)</b>	±100, 250, 500, 1000, 2000	±50, 200, 500, 2000	±50, 200, 500, 2000	±50, 100, 200, 500, 2000, 6000	±50, 100, 200, 500, 2000	±50, 100, 200, 500, 1000
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Critically damped</li> <li>- SAE J211 / 2570 compliant</li> <li>- Compact</li> </ul>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Gas damping</li> <li>- Over-range stops</li> </ul>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Gas damping</li> <li>- Over-range stops</li> </ul>	<ul style="list-style-type: none"> <li>- SAE J211 / 2570 compliant</li> <li>- Flexible, rugged cable</li> <li>- Over-range stops</li> </ul>	<ul style="list-style-type: none"> <li>- Low noise cable</li> <li>- Small package</li> <li>- light weight</li> </ul>	<ul style="list-style-type: none"> <li>- Small size</li> <li>- Flexible, rugged cable</li> <li>- Over-range stops</li> </ul>
<b>Accuracy</b>	±1.0% Non-linearity	±1.0% Non-linearity	±1.0% Non-linearity	±1.0 % Non-linearity	±1% non-linearity	±1.0 % Non-linearity
<b>Operating Temp</b>	-20°C to 80°C	-40°C to 90°C	-40°C to 90°C	-40°C to 121°C	-20°C to 85°C	-20°C to 85°C
<b>Dimensions (mm)</b>	16.7 x 10.0 x 5.0	11.2 x 10.2 x 3.8	9.65 x 4.83 x 3.3	12.19 x 4.83 x 4.83	14.0 x 6.35 x 6.35	8.89 x 8.89 x 9.4
<b>Typical Apps</b>	In-dummy and pedestrian crash testing	Vibration / shock monitoring, shock testing, safety impact testing, side-impact testing	Vibration / shock monitoring, shock testing, safety impact testing, side-impact testing	In-dummy crash and impact testing	Crash testing, impact testing, off-road testing	On-vehicle crash and impact testing, vibration and shock monitoring

## DC Accelerometers

### Plug and Play, Unamplified

Uses piezoresistive MEMS technology with high over-range protection and application-specific packaging.

	 <b>3801A</b>	 <b>3700</b>	 <b>EGAXT</b>	 <b>EGCS-D0 EGCS-D1S</b>	 <b>EGCS-S425</b>
<b>Package</b>	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Anodized aluminum
<b>Type</b>	Stud mount	Screw mount	Adhesive / screw mount	Screw / stud mount	Screw mount
<b>F.S. Range (g)</b>	±2, 10, 20, 50, 100, 200, 500, 2000	±50, 200, 500, 2000, 6000	±5 through 2500	±5 through 10,000	±50, 100, 250, 500, 1000, 2000
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Hermetically sealed sensor</li> <li>- Gas damping</li> <li>- 10,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- No zero shift</li> <li>- mV output</li> <li>- 20,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- Sub-miniature</li> <li>- Lightweight</li> <li>- 10,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- Rugged housing</li> <li>- Critically damped</li> <li>- 10,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- Critically damped</li> <li>- Compact</li> <li>- Mechanical stops</li> </ul>
<b>Accuracy</b>	±0.5% Non-linearity	±2.0% Non-linearity	±1.0 % Non-linearity	±1.0 % Non-linearity	±1.0 % Non-linearity
<b>Operating Temp</b>	-54°C to 121°C	-54°C to 121°C	-40°C to 120°C	-40°C to 120°C	-20°C to 80°C
<b>Dimensions (mm)</b>	15.88 x 15.24	14.22 x 8.13 x 3.81	7.2 x 4.6 x 4.6	D0: 19.05 x 19.05 x 7.62 D1S: 12.7 x 12.7 x 15.24	14.73 x 9.9 x 4.83
<b>Typical Apps</b>	Impact testing, structural testing, test and instrumentation, environmental testing	Impact and shock testing, structural testing, drop testing, aerospace testing	Flight test and control, launch, crash, impact testing, robotics	General purpose, machine control, destructive testing, engine testing	Auto safety testing for side impact, on-vehicle, sled and in-dummy

## MEMS DC Accelerometers

CE, RoHS, EAR99 Compliant

### Plug and Play, Amplified

Uses piezoresistive MEMS technology with digital temperature compensation.

						
	<b>201</b>	<b>4000A/4001A</b>	<b>4600/4602</b>	<b>4610</b>	<b>4801A</b>	<b>4807A</b>
<b>Package</b>	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Stainless steel	Stainless steel
<b>Type</b>	Screw mount	Screw mount	Screw mount	Screw mount	Stud mount	Screw mount
<b>F.S. Range (g)</b>	±2, 5, 10, 20, 30, 50, 100	±2, 5, 10, 20, 50, 100, 200	±2, 10, 30, 50, 100, 200, 500	±2, 5, 10, 20, 50, 100, 200, 500	±2, 10, 20, 50, 100, 200, 500, 2000	±2, 5, 10, 20, 30, 50, 100, 200, 500
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Low noise</li> <li>- Low current consumption</li> <li>- 2 pole electronic filtering</li> </ul>	<ul style="list-style-type: none"> <li>- Integral connector option</li> <li>- Gas damping</li> <li>- Low power</li> </ul>	<ul style="list-style-type: none"> <li>- Exceptional temperature compensation</li> <li>- High over-range protection</li> <li>- Hermetically sealed sensor</li> </ul>	<ul style="list-style-type: none"> <li>- Advanced temperature compensation</li> <li>- Signal conditioned</li> <li>- 10,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- Hermetically sealed sensor</li> <li>- Integral connector</li> <li>- Signal conditioned</li> </ul>	<ul style="list-style-type: none"> <li>- Ultra low noise</li> <li>- Micro-g resolution</li> <li>- Hermetically sealed</li> <li>- Detachable cable</li> </ul>
<b>Accuracy</b>	±1.0% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity	±0.5% Non-linearity
<b>Excitation Voltage</b>	5 - 30 Vdc	8 - 32 Vdc	8 - 36 Vdc	8 - 36 Vdc	8 - 36 Vdc	8 - 18 Vdc
<b>Operating Temp</b>	-40°C to 125°C	-20°C to 85°C	-55°C to 125°C	-40°C to 115°C	-55°C to 125°C	-55°C to 125°C
<b>Dimensions (mm)</b>	25.4 x 21.59 x 9.65	18.54 x 18.54 x 8.64	21.08 x 21.59 x 7.62	21.59 x 25.4 x 7.62	13.33 x 20.83	18.54 x 18.54 x 8.64
<b>Typical Apps</b>	Motorsports, seismic, wind turbine, structural monitoring	Low frequency monitoring, transportation, vibration monitoring, motion control	Flight testing, flutter testing, road test, transportation, structural testing, weapons development	Transportation, motion control, modal analysis, flight testing, flutter testing, road test, structural testing	Impact testing, structural testing, test and instrumentation, environmental testing	Seismic, structural monitoring, flight testing, trains, machine control, road test

## DC Accelerometers

### Plug and Play, Triaxial

Uses piezoresistive MEMS technology.

						
	<b>EGAXT3</b>	<b>53/53A</b>	<b>63/68CM1</b>	<b>4630</b>	<b>4203</b>	<b>606M1</b>
<b>Package</b>	Stainless steel	Anodized aluminum	Stainless steel	Anodized aluminum	Anodized aluminum	Nitrile rubber pad
<b>Type</b>	Stud mount	Adhesive mount	Screw mount	Screw mount	Screw mount	Removable
<b>F.S. Range (g)</b>	±5 through 2500	±50, 200, 500, 2000	±500, 1000, 2000	±2, 5, 10, 20, 50, 100, 200, 500	±6, 7.5, 10, 20, 30	±25
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Sub-miniature</li> <li>- Lightweight</li> <li>- 10,000 g over-range protection</li> </ul>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Gas damping</li> <li>- Low power</li> </ul>	<ul style="list-style-type: none"> <li>- World SID (68CM1)</li> <li>- Gas damping</li> <li>- Low power</li> </ul>	<ul style="list-style-type: none"> <li>- Advanced temperature compensation</li> <li>- Amplified output</li> <li>- 8 - 36Vdc excitation</li> </ul>	<ul style="list-style-type: none"> <li>- EMI / RFI protection</li> <li>- Custom 8-pole LP filters</li> <li>- Temperature compensation</li> </ul>	<ul style="list-style-type: none"> <li>- 0.7 damping ratio</li> <li>- Triaxial, hermetic</li> <li>- Seat pad accelerometer</li> <li>- 606M2 IEPE option</li> </ul>
<b>Accuracy</b>	±1% Non-linearity	±1.0% Non-linearity	±1.0% Non-linearity	±0.5% Non-linearity	±1% Non-linearity	±1% Non-linearity
<b>Operating Temp</b>	-40°C to 120°C	-20°C to 85°C	-20°C to 85°C	-40°C to 115°C	-40°C to 125°C	-20°C to 85°C
<b>Dimensions (mm)</b>	12.7 x 12.7 x 12.7	18.29 x 13.21 x 7.11	12.7 x 12.7 x 12.7	26.16 x 26.16 x 23.37	33.02 x 35.05 x 16	199 x 4
<b>Typical Apps</b>	Flight test, crash, shock monitoring	Auto safety, passenger comfort, transportation, NVH analysis	Auto safety, in-dummy crash, on-vehicle crash	Road test, motion control, transportation, modal analysis, structural testing	Motorsports, seismic, shock monitoring	Off-road equipment, amusement rides, commercial aircraft

## Voltage Mode, Piezoelectric (IEPE) Accelerometers

CE, RoHS, EAR99 Compliant

### Plug and Play

Uses piezo-electric technology with broad frequency response for harsh applications.

		 NEW		 NEW	 NEW	
	<b>7100A/7101A</b>	<b>7102A</b>	<b>7108A</b>	<b>7104A/7105A</b>	<b>7131A/7132A</b>	<b>7120A/7122A</b>
<b>Package</b>	Stainless steel / titanium	Titanium	Stainless steel	Stainless steel	Titanium	Titanium
<b>Type</b>	Through hole mounting	Adhesive mounting	Adhesive mounting	Stud mounting	Adhesive/stud mounting	Adhesive mounting
<b>Sensitivity (mV/g)</b>	100, 10	100, 10	100, 10	100, 50, 10	100, 50, 10, 2.5	1000, 100, 10
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Isolated mounting surface</li> <li>- Hermetically sealed</li> <li>- Wide bandwidth, &gt;10 kHz</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Hermetically sealed</li> <li>- 15 kHz bandwidth</li> <li>- &lt;1 gram</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Wide bandwidth</li> <li>- Welded construction</li> <li>- Small size</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Wide bandwidth</li> <li>- Top and side connector option</li> </ul>	<ul style="list-style-type: none"> <li>- Triaxial, shear mode</li> <li>- &gt;12 kHz bandwidth</li> <li>- 4-pin connector</li> <li>- Hermetically sealed</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Miniature cube</li> <li>- 10 - 32 connector</li> <li>- Hermetically sealed</li> </ul>
<b>Operating Temp</b>	7100A: -55°C to 150°C 7101A: -55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C
<b>Dimensions (mm)</b>	7100A: 9.9 x 22.35 7101A: 5.84 x 14.48	4.40 x 11.94	9.53 x 10.16	7104A: 11.11 x 14.10 7105A: 11.11 x 19.05	7131A: 11 x 11 x 11 7132A: 15.24 x 20.32 x 13.46	10.16 x 10.16 x 19.16
<b>Typical Apps</b>	Flight testing, general purpose, vibration monitoring	Small structures monitoring, component design, high frequency applications	Vibration monitoring, modal testing, general purpose	General purpose IEPE accel, vibration monitoring, lab testing	General purpose, modal testing, vibration monitoring	Modal testing, vibration monitoring, small structures monitoring

## Charge Mode, Piezoelectric Accelerometers

### Plug and Play

Uses piezoelectric technology with broad frequency response for harsh applications.

					 NEW	
	<b>7500A</b>	<b>7501A</b>	<b>7502A</b>	<b>7508A</b>	<b>7514A</b>	<b>7530A</b>
<b>Package</b>	Stainless steel	Titanium	Titanium	Stainless steel	Stainless steel	Hard anodized aluminum
<b>Type</b>	Through hole mount	Through hole mount	Adhesive mounting	Adhesive mounting	Stud mounting	Screw mounting
<b>Sensitivity (pC/g)</b>	20, 13, 7	5.6	1.8	5.6	100, 50, 30, 20, 13	5.6
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Hermetically sealed</li> <li>- Isolated mounting surface</li> <li>- Wide bandwidth</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Hermetically sealed</li> <li>- Bandwidth to &gt;15 kHz</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Hermetically sealed</li> <li>- &lt;1 gram</li> <li>- Wide bandwidth</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- Hermetically sealed</li> <li>- Bandwidth to 8 kHz</li> </ul>	<ul style="list-style-type: none"> <li>- Single axis, shear mode</li> <li>- &gt;12 kHz bandwidth</li> <li>- High sensitivity</li> </ul>	<ul style="list-style-type: none"> <li>- Triaxial, shear mode</li> <li>- Hermetically sealed</li> <li>- Isolated mounting surface</li> <li>- Wide bandwidth</li> </ul>
<b>Operating Temp</b>	-73°C to 260°C	-73°C to 260°C	-73°C to 260°C	-73°C to 260°C	-73°C to 260°C	-73°C to 200°C
<b>Dimensions (mm)</b>	8.38 x 22.35	5.84 x 14.48	4.40 x 11.94	9.53 x 10.16	14.99 x 14.99	18.72 x 18.72 x 11.68
<b>Typical Apps</b>	Gearbox vibration monitoring, flight test, high temp applications	Gearbox vibration monitoring, flight test, high temp applications	Small structures monitoring, minimal mass loading, high temp applications	Small structures monitoring, general purpose, high temp applications	Low frequency vibration, general purpose, high temp applications	Vibration monitoring, drop testing, high temp applications

## Voltage Mode, Piezoelectric Accelerometers

CE, RoHS, EAR99 Compliant

### Plug and Play

Uses piezoelectric technology with broad frequency response for harsh applications.

						
	<b>7202A</b>	<b>7204A</b>	<b>8011/8021-01</b>	<b>8032-01</b>	<b>8011/8021-AR/AP</b>	<b>8011/8021-VR/VP</b>
<b>Package Type</b>	Stainless steel Through hole mount	Stainless steel Through hole mount	Stainless steel Stud / through hole mount	Stainless steel Stud mount	Stainless steel Stud / through hole mount	Stainless steel Stud / through hole mount
<b>Sensitivity (mV/g)</b>	100, 10	100, 10	500, 100, 10	100, 10	4 - 20 mA RMS or peak	4 - 20 mA RMS or peak
<b>Unique Features</b>	- Annular shear mode - Integral strain relief - Case isolated, internally shielded	- Annular shear mode - 3-pin connector - Case isolated, internal shielding - +150°C option	- Industrial accelerometer - Case isolated, internal shielding - Reverse wiring protection - ±1% Non-linearity	- Industrial accelerometer - Case isolated, internal shielding - Low cost - Molded strain relief	- Industrial accelerometer - Case isolated, internal shielding - 50, 20, 10, 5 g ranges	- Velocity transmitter - Case isolated, internal shielding - 0.5 to 5.0 in/sec
<b>Operating Temp</b>	-55°C to 130°C	-55°C to 130°C	-55°C to 125°C	-55°C to 100°C	-40°C to 85°C	-40°C to 85°C
<b>Dimensions (mm)</b>	13.34 x 19.05	13.34 x 19.05	22.23 x 48.26	14.3 x 45.3	22.23 x 48.26	22.23 x 48.26
<b>Typical Apps</b>	HUMS applications, machinery monitoring, harsh environments	HUMS applications, flight testing, high frequency applications	Industrial applications, machine monitoring, intrinsic safety	Industrial applications, machine monitoring	Industrial applications, machine monitoring, intrinsic safety	Industrial applications, machine monitoring, intrinsic safety

## Electronics

### Signal Conditioners

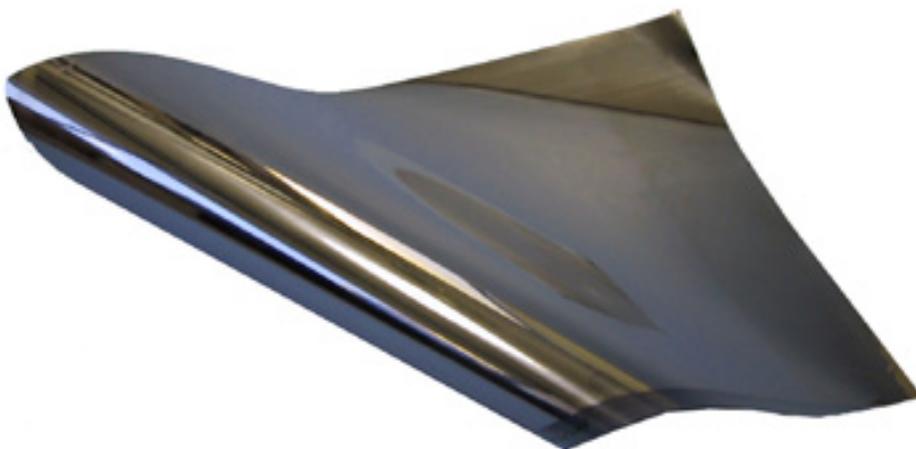
Easy-to-use instrumentation that ensures data integrity.

				
	<b>101</b>	<b>161</b>	<b>130</b>	<b>140</b>
<b>Type</b>	Bench top	Bench top	Inline charge converter	Auto-zero inline amplifier
<b># of Channels</b>	3	4	1	1
<b>Gain Range</b>	0.001 to 999.9	0.001 to 999.9	0.1, 1, 10	10, 25, 50, 100, 200
<b>Unique Features</b>	- DC signal conditioner - 0 - 12 Vdc excitation - Micro-processor controlled - 10 V peak linear output - 4-pole LP filter options	- Charge and IEPE conditioner - Sensitivity normalization - LCD display - Support IEEE 1451.4 TEDS - 10 V peak linear output - Selectable LP filter	- Low noise - Small package - Wide bandwidth - BNC male or female	- ±1.5 mV auto-zero - For PR sensors - 100 kHz bandwidth - 5 to 30 V excitation
<b>Dimensions (mm)</b>	235 x 210 x 84	310 x 180 x 115	Ø13.8 x 52.2	56.9 x 25.4 x 12.7
<b>Typical Apps</b>	Instrumentation labs, test stands, process monitoring	Instrumentation labs, PE/IEPE sensors	Instrumentation labs, high temperature testing PE accelerometer	Instrumentation labs, test stands, strain measurement

# Piezo Film

Piezoelectric fluoropolymer film produces voltage or charge proportional to strain. Exceptionally high strain sensitivity (15 mV/ $\mu\epsilon$ ), in-plane strain bandwidth from < 0.1 Hz to >100 kHz, ultrasound transmit and receive functionality to >100 MHz, and dynamic range of 280 dB characterize the very unique capabilities of Piezo Film. A highly versatile, enabling sensor technology, Piezo Film has thin cross-section (28  $\mu\text{m}$  - 110  $\mu\text{m}$  in thickness), is flexible, very robust, chemically inert and can withstand temperatures up to 85°C (125°C with special processing). Piezo Film is also pyroelectric, capable of generating > 8V/°C. Simple printing with conductive ink defines the active electrode areas. This may be easily customized to give either single elements or complex arrays.

Piezo Cable is a coaxial sensor utilizing piezo film as the sensing material. Available in continuous lengths of 1km or longer, Piezo Cable possesses many of the attributes of Piezo Film in an extremely rugged and shielded form factor that is easy to deploy.



## Piezo Film

					
	<b>DT1 &amp; SDT1</b>	<b>Piezo Cable</b>	<b>CM-01</b>	<b>FLDT1</b>	<b>LDTC Analog PCB</b>
<b>Package</b>	Unshielded element with twisted pair or shielded element with shielded cable	Shielded coaxial 20 gage piezo cable	Metallized plastic housing	Unshielded film element with screen printed leads	Evaluation PCB platform for vibration sensor
<b>Type</b>	Flexible film, adhesive mount	Polymer jacketing; armored jacketing	Contact microphone	Flexible film, adhesive mount	Amplified analog output
<b>Range</b>	15 mV/ $\mu\epsilon$ up to 1% strain	$\mu$ Pa sensitivity	40 V/mm; 8 Hz to 2.2 kHz	15 mV/ $\mu\epsilon$ , up to 1% strain	1 Hz to 117 Hz
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Thin, flexible, robust</li> <li>- Withstands up to 1% strain</li> <li>- Ultra-low power (self generating)</li> </ul>	<ul style="list-style-type: none"> <li>- Continuous lengths to 1km</li> <li>- Shielded construction</li> </ul>	<ul style="list-style-type: none"> <li>- Low noise</li> <li>- Vibration and impact sensing</li> <li>- High sensitivity</li> </ul>	<ul style="list-style-type: none"> <li>- Thin, flexible</li> <li>- Leads screen printed on film</li> <li>- Connects to standard connector</li> </ul>	<ul style="list-style-type: none"> <li>- Low power</li> <li>- High sensitivity</li> <li>- Analog and digital signal access points</li> </ul>
<b>Accuracy</b>	$\pm 20\%$ (typical)	$\pm 20\%$ (typical)	N/A	$\pm 20\%$ typical	$\pm 20\%$
<b>Operating Temp</b>	-40°C to 70°C (up to 125°C available)	-40°C to 85°C (up to 100°C available)	5°C to 60°C	-40°C to 70°C; higher available custom	-20°C to 85°C
<b>Dimensions (mm)</b>	Application dependent	3 mm diameter; continuous lengths	18 dia x 11 high	12 x 30 active; custom available	33 x 46
<b>Typical Apps</b>	Dynamic strain gage, contact microphone, acoustic pickup	Perimeter and fence security; geophone, impact sensors, intrusion detection, seat occupancy (e.g. airbag), patient bed vital signs monitor	Electronic stethoscope, contact microphone, vibration and impact sensing	Event timing, dynamic strain, motion detection	Vibration sensing, wake-up sensor, activity sensor

						
	<b>Laboratory Amplifier</b>	<b>80 KHz Transducers</b>	<b>NDT-1</b>	<b>Tamper Box</b>	<b>ACH01</b>	<b>LDTC Family</b>
<b>Package</b>	Bench top	Pin mounted	Adhesive mounted	Flat film or box mounted	Ceramic base, plastic cover, shielded cable	Piezo film elements with or without mass and pins
<b>Type</b>	Piezo film lab amp	Air ultrasound transducer	High frequency ultrasound transducer	Tamper detection sensor	Adhesive mount	Cantilever beam with vertical or horizontal pins
<b>Range</b>	0.1 Hz to 100 kHz	80 kHz	3 MHz	Application dependent	$\pm 250$ g (typical)	$\pm 10$ g (typical)
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Voltage or charge mode settings</li> <li>- Multi-pole high- and low-pass filters</li> <li>- Adjustable gain</li> </ul>	<ul style="list-style-type: none"> <li>- Small size</li> <li>- Low mechanical Q</li> <li>- Shielded package</li> </ul>	<ul style="list-style-type: none"> <li>- Flexible</li> <li>- High bandwidth, low Q</li> <li>- Low impedance</li> </ul>	<ul style="list-style-type: none"> <li>- Low power</li> <li>- Custom shapes and sizes</li> <li>- High security</li> </ul>	<ul style="list-style-type: none"> <li>- Extremely high bandwidth</li> <li>- Low cost</li> <li>- Ultra-low power</li> </ul>	<ul style="list-style-type: none"> <li>- Very low cost</li> <li>- High sensitivity (1 V/g)</li> <li>- Ultra-low power (self generating)</li> </ul>
<b>Accuracy</b>	Application dependent	Application dependent	Application dependent	Application dependent	$\pm 20\%$ (typical)	$\pm 20\%$ (typical)
<b>Operating Temp</b>	0°C to 40°C	-20°C to 80°C	-20°C to 60°C	-40°C to 85°C	-40°C to 85°C	-40°C to 70°C
<b>Dimensions (mm)</b>	150 x 100 x 100	6 dia x 9	12 x 30	Application dependent	18.80 x 13.21 x 6.10	19.05 x 6.35 x 6.35
<b>Typical Apps</b>	Low frequency dynamic strain, piezoelectric signals, machine vibration, piezo cable and traffic sensor interface	Air ranging, ultrasonic mouse, digitizers	Thickness measurement, speed of sound measurement, pulse/echo NDT	Encryption modules, POS card readers, PIN entry devices	Vibration sensing, gear box and high speed monitoring, high speed bearings and centrifuges, speaker motion feedback	Wake-up switch, load imbalance, antitheft devices, impact sensing, vital signs monitoring

# SCANNER

The aerodynamic research group of measurement specialties provides data systems based on the electronic pressure and temperature scanners of legacy brand Pressure Systems. These products have been developed specifically for wind tunnel testing, flight testing and turbomachinery test and measurement applications. Extensive factory calibration combined with custom MEMS-like technology provide system solutions with high accuracy digital interface to host computers and networks. Pressure ranges are available from 1.3" H<sub>2</sub>O (300 Pa) to 10,000 psi (69 MPa). Temperature inputs can be acquired from standard and custom thermocouples as well as RTD's. Software is included with each solution.



## Pressure and Temperature

### NetScanner™ Complete Data Acquisition Devices

**NEW**



**9116**

<b>Measurement Type</b>	Pressure
<b>Media</b>	Dry
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	16
<b>EU Throughput Rate</b>	500 Hz
<b>Enclosure</b>	IP66 / 30g vibration
<b>Typical Apps</b>	Engine testing, portable data acquisition, wind tunnel research, process monitoring



**9146-R**

<b>Measurement Type</b>	Temperature
<b>Media</b>	RTD / TC / Volt
<b>Accuracy</b>	±0.25°C
<b># of Channels</b>	16 / 32
<b>EU Throughput Rate</b>	33 Hz
<b>Enclosure</b>	IP66 / 30g vibration
<b>Typical Apps</b>	Engine testing, portable data acquisition, wind tunnel research, process monitoring



**9146-T**

<b>Measurement Type</b>	Temperature
<b>Media</b>	TC
<b>Accuracy</b>	±0.25°C
<b># of Channels</b>	16
<b>EU Throughput Rate</b>	33 Hz
<b>Enclosure</b>	IP54 / 30g vibration
<b>Typical Apps</b>	Engine testing, portable data acquisition, wind tunnel research, process monitoring



**9022**

<b>Measurement Type</b>	Pressure
<b>Media</b>	Remote
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	12
<b>EU Throughput Rate</b>	100 Hz
<b>Enclosure</b>	IP64 / 30g vibration
<b>Typical Apps</b>	Engine testing, third party transducers, close coupled requirements, high pressure

## Pressure and Temperature

### NetScanner™ Complete Data Acquisition Devices



#### 9032

<b>Measurement Type</b>	Barometer
<b>Media</b>	Dry
<b>Accuracy</b>	±0.01% FS
<b># of Channels</b>	1
<b>EU Throughput Rate</b>	10 Hz
<b>Enclosure</b>	Laboratory grade
<b>Typical Apps</b>	Barometric monitor, precision reference



#### 9034, 9038

<b>Measurement Type</b>	Calibrator
<b>Media</b>	Dry
<b>Accuracy</b>	±0.01% FS
<b># of Channels</b>	1
<b>EU Throughput Rate</b>	10 Hz
<b>Enclosure</b>	Laboratory grade
<b>Typical Apps</b>	Calibration, transfer standard, verification testing



#### 98RK-1, 9816

<b>Measurement Type</b>	Pressure
<b>Media</b>	Dry
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	128
<b>EU Throughput Rate</b>	100 Hz
<b>Enclosure</b>	19" rackmount / 4U
<b>Typical Apps</b>	Turbine engine test, control room location



#### 90DB, 91FC

<b>Measurement Type</b>	Interface
<b>Media</b>	N/A
<b>Accuracy</b>	N/A
<b># of Channels</b>	15 / 7 / 1
<b>EU Throughput Rate</b>	10 / 100 Base-T
<b>Enclosure</b>	19" rackmount / 1U
<b>Typical Apps</b>	Turbine engine test, power supply

## Scanners and Data Acquisition Systems

### Miniature High Density Pressure Scanners



#### 64HD DTC

<b>Type</b>	Pressure
<b>Media</b>	Dry
<b>Accuracy</b>	±0.03% FS
<b># of Channels</b>	64
<b>Thermal Comp</b>	Active (DTC)
<b>Port Sizes</b>	0.040 in.
<b>Typical Apps</b>	Wind tunnel research, flight test, on vehicle research



#### 32HD DTC

<b>Type</b>	Pressure
<b>Media</b>	Dry
<b>Accuracy</b>	±0.03% FS
<b># of Channels</b>	32
<b>Thermal Comp</b>	Active (DTC)
<b>Port Sizes</b>	0.040 or 0.063 in.
<b>Typical Apps</b>	Wind tunnel research, flight test, on vehicle research



#### 64HD, 32HD, 16HD

<b>Type</b>	Pressure
<b>Media</b>	Dry
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	64, 32 or 16
<b>Thermal Comp</b>	Passive
<b>Port Sizes</b>	0.040 or 0.63 in.
<b>Typical Apps</b>	Wind tunnel research, flight test, on vehicle research

### Multi-Scanner Data Acquisition Systems



#### DTC Initium

<b>Type</b>	Pressure scanning
<b>Media</b>	Dry
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	512
<b>EU Throughput Rate</b>	1200 Hz
<b>Enclosure</b>	Laboratory grade
<b>Typical Apps</b>	Wind engineering, aerospace development



#### 8400 System

<b>Type</b>	Pressure scanning
<b>Media</b>	Dry
<b>Accuracy</b>	±0.03% FS
<b># of Channels</b>	4096
<b>EU Throughput Rate</b>	200 Hz
<b>Enclosure</b>	Rack mount
<b>Typical Apps</b>	Aerospace development



#### Interface

<b>Type</b>	A/D conversion
<b>Media</b>	Dry
<b>Accuracy</b>	±0.05% FS
<b># of Channels</b>	1024
<b>EU Throughput Rate</b>	200 Hz
<b>Enclosure</b>	Miniature
<b>Typical Apps</b>	In model placement, 8400 system interface



#### Pneumatics

<b>Type</b>	Quick disconnect
<b>Media</b>	Dry
<b>Accuracy</b>	N/A
<b># of Channels</b>	19, 20, 36, 37, 52, 55, 73
<b>EU Throughput Rate</b>	N/A
<b>Enclosure</b>	Circular or square
<b>Typical Apps</b>	Bulkhead mounted, in-line, reducing port sizes

Solutions by Sensor Type:

Fluid Properties

# FluidPro

Measurement Specialties approaches the measurement of fluids using two distinct technologies. Its patented tuning fork technology is coupled with efficient software algorithms for accurate measurement of viscosity, density and dielectric constant. Highly reliable reed switch technology is combined with temperature measurement for level sensing. Dedicated applications include, among others, oils (engine, hydraulic, transmission), fuels and DEF/AdBlue® fluid monitoring.

Robust design enables FPS sensors to operate under diverse pressure, flow and temperature conditions to bring real time fluid monitoring to engines, fuel systems, SCR systems, compressors, transmissions, gear boxes and many other industrial applications.

Our new Water in Oil measurement sensor supplements the existing fluid quality range of products.



## Fluid Property Sensors

### FPS

Directly and simultaneously measures the fluid properties and temperature.



#### FPS2810

**Package** Fully integrated, stand-alone module combines sensor and processing electronics for in-situ monitoring

**Type** Engine oil quality sensor

**Operating Range** Viscosity from 0.5 to 50 mPa-s  
Density from 0.65 to 1.5 g/cc  
Dielectric from 1.0 to 6.0

**Operating Temp** -40°C to 150°C

**Unique Features**

- Rugged construction for high pressure and high flow environments
- CAN communication protocol (SAEJ1939 compliant)

**Calibration** Factory calibrated with NIST traceable standards

**Dimensions (mm)** 73.3 x 30 x 30

**Typical Apps** Engine quality monitoring for on and off highway vehicles: degradation, oxidation, fuel dilution, soot contamination



#### FPS2840

Fully integrated, stand-alone module combines sensor and processing electronics for in-situ monitoring

Hydraulic oil quality sensor

Viscosity from 0.5 to 50 mPa-s  
Density from 0.65 to 1.5 g/cc  
Dielectric from 1.0 to 6.0

-40°C to 150°C

- Rugged construction for high pressure and high flow environments
- CAN communication protocol (SAEJ1939 compliant)

Factory calibrated with NIST traceable standards

73.3 x 30 x 30

Hydraulic oil quality monitoring for on and off highway vehicles, HVAC&R, compressors, industrial equipments, turbines: degradation, oxidation, water content



#### FPS2X60

Fully integrated, stand-alone module combines sensor and processing electronics for in-situ monitoring

Transmission oil quality sensor

Viscosity up to 20,000 mPa-s  
Density from 0.65 to 1.5 g/cc  
Dielectric from 1.0 to 6.0

-40°C to 150°C

- Rugged construction for high pressure and high flow environments

Factory calibrated with NIST traceable standards

73.3 x 30 x 30

Transmission oil quality monitoring in high viscosity conditions for on and off highway vehicles, HVAC&R, compressors, industrial equipments, turbines: degradation, oxidation



#### HTM2500B3C4 OIL

Fully integrated, stand-alone module combines sensor and processing electronics for in-situ monitoring

Water content in oil and temperature sensor

0 to 1 aw  
(aw, activity = water content / water content in saturated oil)

-40°C to 85°C

- Full interchangeability
- High reliability and demonstrated long term stability in oil
- Ratiometric to voltage supply
- Sensitive elements with unique mechanical and chemical robustness

Factory calibrated and tested

76.2 x 30 x 30

Water content in oil and temperature monitoring for automotive, truck, transformers, industrial applications



#### FPS2X20 / FPS2X30

**Package** Fully integrated sensor and processing electronics provide a single sensor solution for in-line or in-tank fuel monitoring

**Type** Fuel quality sensor

**Operating Range** Viscosity from 0.5 to 50 mPa-s  
Density from 0.65 to 1.5 g/cc  
Dielectric from 1.0 to 6.0

**Operating Temp** -40°C to 150°C

**Unique Features**

- Rugged construction for high pressure and high flow environments

**Calibration** Factory calibrated with NIST traceable standards

**Dimensions (mm)** 73.3 x 30 x 30

**Typical Apps** Diesel, biodiesel, jet, gasoline and flexfuel monitoring, fuel type detection, biodiesel concentration measurement, fuel quality monitoring for engines, turbines, electric power generation, aviation, marine, etc



#### FPS5851

**Package** Fully integrated sensor and processing electronics provide a solid state sensor for in-line urea quality monitoring

**Type** Urea quality sensor

**Operating Range** Urea concentration from 5 to 62.5% mass

**Operating Temp** -40°C to 125°C

**Unique Features**

- Rugged SST-based construction for demanding environment (vibration, side-load)
- Urea resistant DIN70070 / ISO22241 material
- High reliability and long term stability
- Integrated design to be installed directly on the pump output or on the dosing line
- Optimized for OEM specifications

**Calibration** Factory calibrated in compliance with DIN70070 / ISO 22241 standards

**Dimensions (mm)** 93 x 57 x 42 (+SAEJ2044 fluid connecting pipe)

**Typical Apps** Monitoring urea concentration and urea quality of diesel exhaust fluid (DEF) used in selective catalytic reduction systems (SCR). Detection of unauthorized fluids for SCR systems applications

## DEF/AdBlue® SCR Sensors

### In-line DEF/AdBlue® Quality Sensor

## DEF/AdBlue® SCR Sensors

NEW

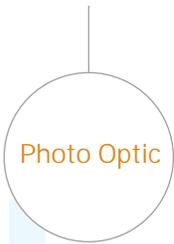
### DEF/AdBlue® Level Sensors

					
	<b>FLS WH Series</b>	<b>FLS RB Series</b>	<b>FLS PC Series</b>	<b>FLS P Series</b>	<b>FLS PU Series</b>
<b>Package</b>	Stainless steel header and body	Rubber header and stainless steel body	Nylon header and stainless steel body	Plastic header and stainless steel body	Plastic header and stainless steel body
<b>Type</b>	Combined level sensor, temperature sensor, filter, AdBlue® draw and return solenoid controlled heater, locking ring header	Combined level sensor, temperature sensor, filter, AdBlue® draw and return heater, collar header	Combined level sensor, temperature sensor, filter, AdBlue® draw and return heater, bayonet header	Combined level sensor, temperature sensor	Combined level sensor, temperature sensor, filter, AdBlue® draw and return heater, bayonet header
<b>Operating Temp</b>	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
<b>Features</b>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Optional solenoid valve</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Various collar adapter options</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> </ul>

## DEF/AdBlue® SCR Sensors with Quality Measurement

### In-tank DEF/AdBlue® Level and Quality Sensors

					
	<b>QLS WH Series</b>	<b>QLS RB Series</b>	<b>QLS PC Series</b>	<b>QLS P Series</b>	<b>QLS PU Series</b>
<b>Package</b>	Stainless steel header and body	Rubber header and stainless steel body	Nylon header and stainless steel body	Plastic header and stainless steel body	Plastic header and stainless steel body
<b>Type</b>	Combined level sensor with quality measurement, temperature sensor, filter, AdBlue® draw and return solenoid controlled heater, locking ring header	Combined level sensor with quality measurement, temperature sensor, filter, AdBlue® draw and return heater, collar header	Combined level sensor with quality measurement, temperature sensor, filter, AdBlue® draw and return heater, bayonet header	Combined level sensor with quality measurement, temperature sensor	Combined level sensor with quality measurement, temperature sensor, filter, AdBlue® draw and return heater, bayonet header
<b>Operating Temp</b>	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
<b>Features</b>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Optional solenoid valve</li> <li>- Integrated quality sensor</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Integrated quality sensor</li> <li>- Various collar adapter options</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Integrated quality sensor</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Integrated quality sensor</li> </ul>	<ul style="list-style-type: none"> <li>- Available in a range of sizes</li> <li>- High reliability</li> <li>- Reed switch technology</li> <li>- Using coolant system to thaw frozen</li> <li>- DEF / AdBlue® feed and return connections can be incorporated into the header</li> <li>- Integrated quality sensor</li> </ul>



# Photo Optic

The MEAS line of Photo Optic Sensors includes both photo optic components and complete sensor solutions. Our component series features dual LED, bi-wavelength emitters and spectrally paired photo detectors. MEAS optics are ideally suited for medical applications for which the selection of peak wavelength is a priority, such as pulse oximetry (SpO<sub>2</sub>). We also package our optics into complete probe assemblies for pulse oximetry (SpO<sub>2</sub>) monitoring applications. The MEAS OEM pulse oximetry (SpO<sub>2</sub>) probe platform includes reusable finger clips, soft silicone boots, and a range of disposable sensors.



## Photo Optic Sensors

### Photo Optic Components and Pulse Oximetry Probe Platforms



**ELM-4000**

<b>Package</b>	Lead frame
<b>Type</b>	Emitter assembly
<b>Range</b>	660 nm / 880-940 nm
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Dual drive</li> <li>- Clear epoxy lens</li> </ul>
<b>Accuracy</b>	Sensor dependent
<b>Operating Temp</b>	-55°C to 70°C
<b>Dimensions (mm)</b>	4.4 x 5.1 x 1.9
<b>Typical Apps</b>	Pulse oximetry, finger/ear probes, disposable



**EPM-4000**

<b>Package</b>	Lead frame
<b>Type</b>	Detector assembly
<b>Range</b>	660 nm / 880-940 nm
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Low cost</li> <li>- Fast response</li> <li>- High efficiency</li> </ul>
<b>Accuracy</b>	Sensor dependent
<b>Operating Temp</b>	-55°C to 70°C
<b>Dimensions (mm)</b>	4.4 x 5.1 x 1.8
<b>Typical Apps</b>	Pulse oximetry, finger/ear probes, disposable



**Disposable Sensor**

<b>Package</b>	Biocompatible
<b>Type</b>	Sensor platform
<b>Range</b>	Adult / neonatal
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Latex free</li> <li>- Lightweight</li> <li>- Microfoam / cloth</li> </ul>
<b>Accuracy</b>	Sensor dependent
<b>Operating Temp</b>	-55°C to 70°C
<b>Dimensions (mm)</b>	
<b>Typical Apps</b>	Pulse oximetry



**Finger Clip Sensor**

<b>Package</b>	Biocompatible
<b>Type</b>	Sensor platform
<b>Range</b>	Adult
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Soft pads</li> <li>- Lightweight</li> <li>- Easily cleaned</li> </ul>
<b>Accuracy</b>	Sensor dependent
<b>Operating Temp</b>	-55°C to 70°C
<b>Dimensions (mm)</b>	
<b>Typical Apps</b>	Pulse oximetry



**Soft Sensor**

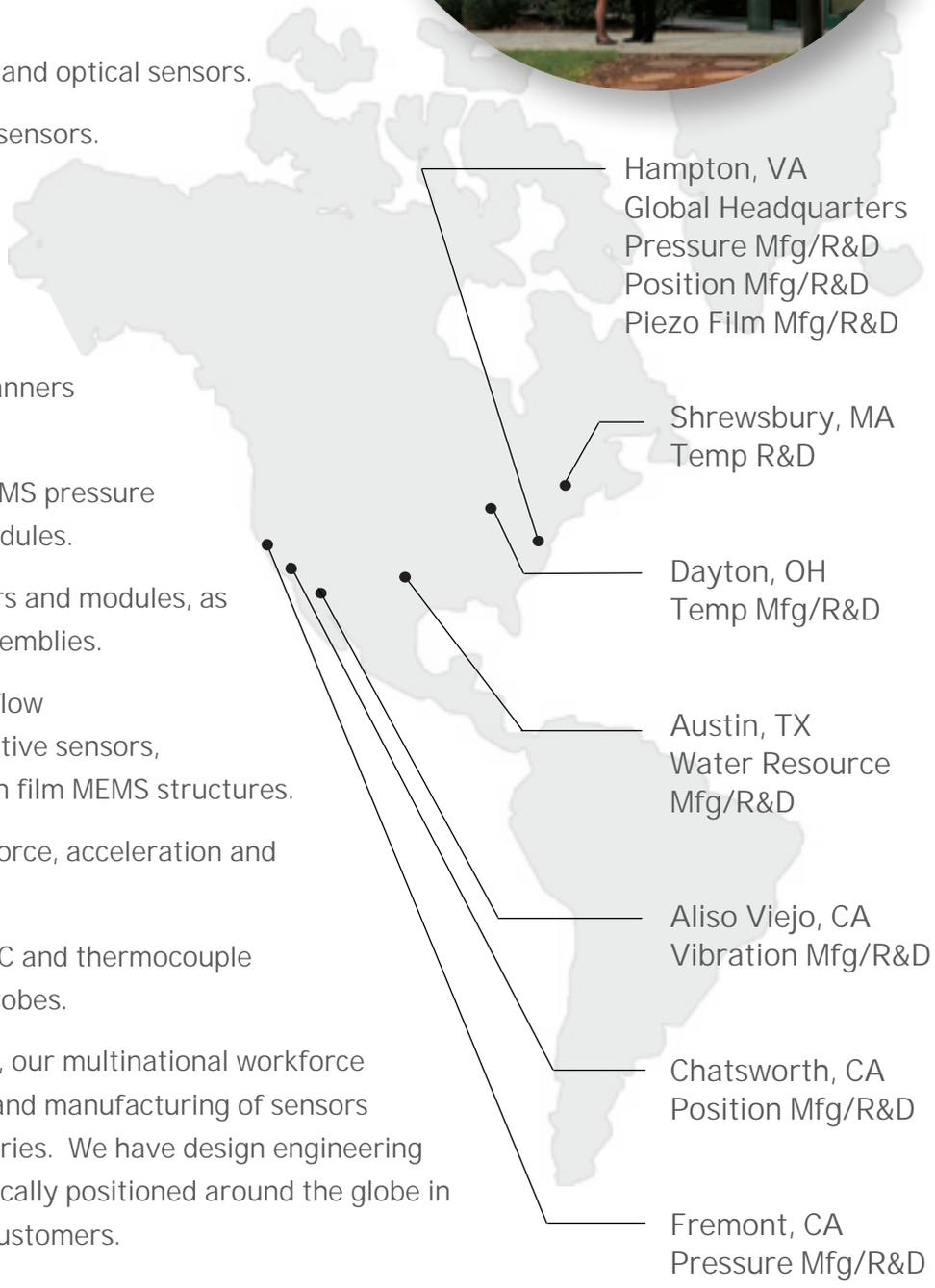
<b>Package</b>	Silicon boot
<b>Type</b>	Sensor platform
<b>Range</b>	Adult / pediatric
<b>Unique Features</b>	<ul style="list-style-type: none"> <li>- Ease of use</li> <li>- Lightweight</li> <li>- Latex free</li> </ul>
<b>Accuracy</b>	Sensor dependent
<b>Operating Temp</b>	-55°C to 70°C
<b>Dimensions (mm)</b>	
<b>Typical Apps</b>	Pulse oximetry



Measurement Specialties is a unique sensor business that combines the strengths and experiences of several merged sensor companies to resolve challenging physical measurement problems. Our products have a proud lineage from the pioneering work of ICSensors in MEMS (micro electro-mechanical systems) technology and Schaevitz in inductive position sensing. During the last decade, we have significantly expanded our product offerings and enriched our technical capabilities through additional strategic acquisitions, including:

- Gentech. Liquid level, position, flow and optical sensors.
- Celesco. Rotary and linear position sensors.
- Eureka Environmental Engineering. Multiparameter instrumentation and software for water quality monitoring.
- Pressure Systems, Inc. Pressure scanners and water level measurement.
- Intersema Sensoric. Low power, MEMS pressure sensors, electronics and custom modules.
- Humirel. Capacitive humidity sensors and modules, as well as multi-parameter sensing assemblies.
- HL Planartechnik. Planar mass air flow elements, multi-layer magneto resistive sensors, thermopiles and various custom thin film MEMS structures.
- ENTRAN / FGP. Custom pressure, force, acceleration and torque sensors.
- BetaTHERM / YSI / Atexis. NTC, PTC and thermocouple temperature sensors and custom probes.

Today, united under the MEAS brand, our multinational workforce of 3000+ is dedicated to the design and manufacturing of sensors for customers in more than 60 countries. We have design engineering and manufacturing locations strategically positioned around the globe in order to put resources close to our customers.





Toulouse, France  
European Headquarters  
Humidity Mfg/R&D  
Fluid Property Mfg/R&D

Shenzhen, China  
Asian Headquarters  
Various Sensors Mfg/R&D

Galway, Ireland  
Temperature Mfg/R&D

Girvan, Scotland  
Position - Level - Flow Mfg/R&D

Les Clayes-Sous-Bois, France  
Force - Torque Mfg/R&D  
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Position - Temperature Mfg/R&D  
Foundry Services

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