measurement
SPECIALTIES

sensing your world...

Embedded Sensing Technologies

measurement SPECIALTIES

Measurement Specialties knows how to support OEMs

Measurement Specialties (MEAS) designs and manufactures sensors that measure pressure/force, position, vibration, temperature, humidity, torque 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.

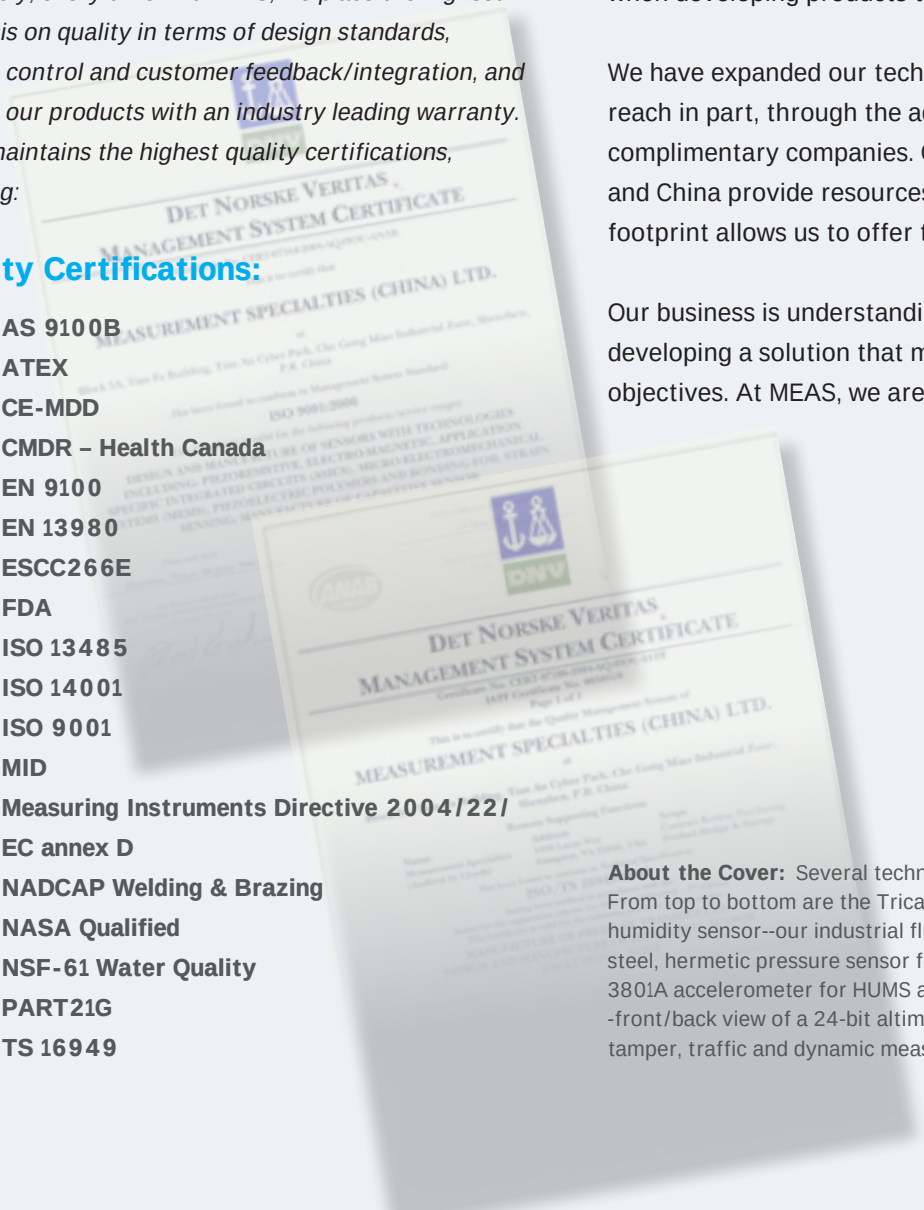
We have expanded our technology portfolio and geographic reach in part, through the acquisition of strategically complimentary companies. Our operations in the US, Europe and China provide resources close to our customers. This global footprint allows us to offer the lowest cost of ownership to OEMs.

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

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 Certifications:

- AS 9100B
- ATEX
- CE-MDD
- CMDR – Health Canada
- EN 9100
- EN 13980
- ESCC266E
- FDA
- ISO 13485
- ISO 14001
- ISO 9001
- MID
- Measuring Instruments Directive 2004/22/ EC annex D
- NADCAP Welding & Brazing
- NASA Qualified
- NSF-61 Water Quality
- PART21G
- TS 16949



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--a new stainless steel, hermetic pressure sensor for HVAC and rugged environments--the 3801A accelerometer for HUMS applications--a robust temperature sensor--front/back view of a 24-bit altimeter and our patented Piezo Film used in tamper, traffic and dynamic measurement applications.

Measurement Specialties is a pioneer in the design and manufacture of precision sensors for electro-mechanical flight control applications, test & 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	FS20	FC22	FC23
Package	Low profile “coin cell” design	Miniature; drop in replacement for industry standard	Plastic housing, button, flange mounting	Stainless steel housing button shape for higher weight loads
Operating Mode	Compression	Compression	Compression	Compression
Unique Features	- Ultra low cost, low strain design - Essentially unlimited cycle life	- Load cell design operates at very low strains - not subject to lead die fatigue	- Low cost button shape - Essentially unlimited cycle life	- Industry standard low profile all stainless steel design - Resistant to off-axis loads.
Ranges (Lbf)	10, 25, 50, 100	1.5, 3	25, 50, 100	250, 500, 1000, 2000
Max Overload	2.5X	10 lbf	2.5X	1.5X and 2.5X
Output / Span	100 mV	1.0 to 4.0 V	100 mV, 0.5 to 4.5 Vdc	100 mV
Combined Linearity & Hysteresis	±1.0% FSO	±1.0% FSO	±1.0% FSO	±1.0% FSO
Operating Temp	-40°C to 85°C	0°C to 70°C	-40°C to 85°C	-40°C to 85°C
Dimensions (mm)	Ø 25.00 x 29.50 x 8.00	30.708 x 17.272 x 8.255	Ø 26.00 x 42.00 x 19.50	Ø 31.75 x 10.20
Typical Apps	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices	Infusion pumps, contact sensing, medical devices, consumer appliances	Infusion pumps, robotics end-effectors, exercise machines, contact sensing, appliances	Batch weighing, robotics, assembly line force, printing presses, pumps, winch & hoist

Load Cells

Test and Measurement

	ELPF	ELFF	ELWF	ELAF
Package	Dual Stud	Dual Stud	Through hole	Button
Operating Mode	Tension and Compression	Tension and Compression	Compression	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	- Low Cost - Optional High Level Output - Small, Low Profile Design - Low Deflection - NIST traceable calibration provided	- Low Cost - Through-Hole Design - Low Profile - Essentially Unlimited Life Cycle - NIST traceable calibration provided	- Low Cost - Small, Low Profile Design - Low Off-Axis Response - Essentially Unlimited Life Cycle - NIST traceable calibration provided
Ranges N (Lbf)	50 to 2.5K (10 to 500)	50 to 500 (10 to 100)	25 to 10K (5 to 2K)	50 to 25K (10 to 5K)
Max Overhead	2.5X F.S.	2.5X F.S.	1.5X to 2X F.S.	2.5X F.S.
Output/Span	100 mV (0.5-4.5 V optional)	100 mV (0.5-4.5 V optional)	100 mV (0.5-4.5 V optional)	100 mV (0.5-4.5 V optional)
Non Linearity	±0.25% F.S.	±0.5% F.S.	±5% F.S.	±0.25% F.S.
Hysteresis	±0.25% F.S.	±0.5% F.S.	±1% F.S.	±0.25% F.S.
Operating Temp	-40°C to 120°C (-40°F to 248°F)	-40°C to 120°C (-40°F to 248°F)	-40°C to 120°C (-40°F to 248°F)	-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	B4 Ø 12.70 x 4.05 T2 Ø 12.70 x 16.35 T4 Ø 12.70 x 22.80	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	B0 Ø 12.70 x 9.53 B2 Ø 31.75 x 11.20 B3 Ø 38.10 x 18.00
Typical Apps	Research, materials test, medical instrumentation, physical therapy, weighing, thrust, biomechanical measurements, product validation test	Robotics and effectors, dental and biomechanical parameter measurements, satellite and aerospace force feedback	Bolt loads, thrust measurements, product validation test	Theatrical rigging loads, assembly forces, weighing, thrust measurements, product validation testing

Load Cells

Test and Measurement

	XFC200R	XFL212R	XFL225D	XFTC300 Series
Package	Small diameter load button	Low profile load button	Through hole	Low/high capacity dual stud
Operating Mode	Compression	Compression	Compression	Tension and Compression
Unique Features	- High stiffness - High overload capacity - Static and dynamic	- Extremely flat - Integrated load button - Small diameter	- Strain relief spring - Very flat - Static and dynamic	- High stiffness - High overload capacity - Threaded male/female fitting
Ranges N (Lbf)	2 to 10K (0.4 to 2K)	5 to 500 (1 to 100)	10 to 5K (2 to 1K)	2 to 2K (0.4 to 400)
Max Over-range	2X to 4X F.S.	2X F.S.	2X F.S.	2X to 4X F.S.
Output/Span	100 mV	100 mV	100 mV	100 mV (4 V; ±5 V optional)
Non Linearity	≤±0.5% F.S.	≤±0.5% F.S.	≤±0.5% F.S.	≤±0.5% F.S.
Hysteresis	≤±0.5% F.S.	≤±0.5% F.S.	≤±0.5% F.S.	≤±0.5% F.S.
Optional operating Temp	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)
Dimensions (mm)	Ø 10 to Ø 16	Ø 12.5 x 3.5	Ø 25	Application Dependent
Typical Apps	Material test, measuring tools, robotics and effectors	Dental and biomechanical, surface mount assembly system, production validation test	Bolt loads, tool forces, biomechanical force measurement	Material test, tool forces, robotics end effectors

Load Cells

Standard

	ELHM, ELHS	FN3002	FN2420	FN1010
Package	High capacity dual stud or button style	Very high capacity dual stud	Very high capacity load button	Load pin design
Operating Mode	Tension and Compression	Tension and Compression	Compression	Tension and Compression
Unique Features	- Tension and compression or compression only - High stability metal foil strain gage (ELHM) - High output semiconductor strain gage (ELHS) - NIST traceable calibration provided	- Threaded male fitting - Integrated amplifier - Optional rod end	- High stiffness - Optional load button - Optional high level output module	- Keyed antirotation slot - Bidirectional available - Optional watertight construction
Ranges N (Lbf)	1K to 50K (200 to 10K)	10K to 2,000K (2K to 400K)	20K to 5,000K (4K to 1,000K)	10K to 2,000K (2K to 400K)
Max Over-range	1.5X F.S.	1.5X F.S.	1.5X F.S.	1.5X F.S.
Output/Span	10 mV (ELHM), 200 mV FSO (ELHS)	±20 mV (4 V; ±5 V optional)	20 mV (4 V; 5 V)	±20 mV (4 V; ±5 V; 4-20 mA optional)
Non Linearity	0.3% to 0.5% FSO	±0.25% F.S.	±0.1% F.S.	±1% F.S.
Hysteresis	Combined with Linearity	Combined with Linearity	±0.1% F.S.	Combined with Linearity
Optional operating Temp	-50°C to 120°C (ELHM), -20°C to 80°C (ELHS)	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)	-20°C to 80°C (-4°F to 176°F)
Dimensions (mm)	Application Dependent	Application Dependent	Application Dependent	Application Dependent
Typical Apps	Robust general purpose, low deflection design: machine tool, linkage forces	Assembly forces, tool force, offshore	Calibration presses, robotics and effectors, laboratory and research	Crane monitoring, offshore, load-limited devices

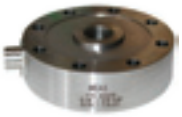
Load Cells

S-Beam Standard

	FN3030	FN3060	FN3280	FN3148	FN7110
					
Package	S-beam	S-beam	S-beam with Stops	S-beam with Stops	Dual S-beam range
Operating Mode	Tension and Compression	Tension and Compression	Tension and Compression	Tension and Compression	Tension and Compression
Unique Features	- Optional rod ends - Optional high level output - Low cost	- Fatigue rated - Optional high level output - S-beam technology	- Very low range - High resolution - Mechanical stops	- Very high accuracy - High resolution - Mechanical stops	- High resolution - Optional high level output - Double range
Ranges N (Lbf)	50 to 100K (10 to 20K)	250 to 2.5K (50 to 500)	1 to 5 (0.2 to 1)	10 to 2K (2 to 400)	10/100 to 1K/10K (2/20 to 200/2K)
Max Over-range	1.5X F.S.	1.5X F.S.	40X to 100X F.S	5X to 100X F.S	1.2X F.S. of the higher range
Output/Span	±20 mV (4 V; ±5 V optional)	±15 mV (4 V; ±5 V optional)	±10 to 20 mV	±20 mV (4 V; ±5 V optional)	±20 mV (4 V; ±5 V optional)
Non Linearity	±0.1% F.S	±0.1% F.S	±0.1% F.S	<±0.05% F.S	±0.1% F.S. of each range
Hysteresis	Combined with Linearity	Combined with Linearity	Combined with Linearity	Combined with Linearity	
Optional operating Temp	-40°C to 150°C (-40°F to 302°F)	-40°C to 120°C (-40°F to 248°F)	-20°C to 80°C (-4°F to 176 °F)	-40°C to 120°C (-40°F to 248°F)	-20°C to 80°C (-4°F to 176°F)
Dimensions (mm)	Application Dependent	50 x 25 x 60	Application Dependent	Application Dependent	60 x 30 x 100
Typical Apps	Laboratory and research, process control, robotics and effectors	Test bed, dynamic fatigue testing, robotics and effectors	Product validation tests, medical instruments, weighing	Product validation tests, medical instruments, weighing	Product validation tests, process control, robotics and effectors

Load Cells

Low profile and Pan-Cake

	FMT	FN3050	FN3000	FN3042	FN7325
					
Package	Washer	Pan-Cake	Very high capacity Pan-Cake	Pan-Cake	Custom Design/Ranges on request
Operating Mode	Compression	Tension and Compression	Tension and Compression	Tension and Compression	Multiaxial Force and Torque
Unique Features	- High stiffness - 1.5X over-range - High temperature	- Connector or cable gland output - Same housing all ranges - Optional high level output - Optional compression stops	- High stability - Aluminum or stainless steel - Optional high level output	- Integrated amplifier - Optional Skydrol compatibility - Fatigue rated	- Measures Load/Toque in 3 directions - Fatigue rated - Minimal cross effects
Ranges N (Lbf)	20K to 320K (4K to 64K)	100 to 20K (20 to 4K)	10K to 1000K (2K to 200K)	5K to 500K (1K to 100K)	5K to 250K (1K to 50K)
Max Over-range	1.5X F.S.	1.5X F.S. (10X F.S. with stops)	1.5X F.S.	2X F.S.	1.2X F.S.
Output/Span	15 to 20 mV	±15 mV (4 V; ±5 V optional)	±20 mV (4 V; ±5 V optional)	±15 mV (4 V; ±5 V optional)	±100 to 150 mV (4 V; ±5 V optional)
Non Linearity	1 to 5% F.S.	±0.1% F.S.	±0.1% F.S.	±0.25% F.S.	±1% F.S.
Hysteresis	Combined with Linearity	±0.1% F.S.	±0.1% F.S.	Combined with Linearity	Combined with Linearity
Optional operating Temp	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)	-40°C to 150°C (-40°F to 302°F)	-40°C to 120°C (-40°F to 248°F)	-20°C to 80°C (-4°F to 176°F)
Dimensions (mm)	Application Dependent	Ø70 x 25	Application Dependent	Application Dependent	Application Dependent
Typical Apps	Robotics, process control, blot clamping for bridges	Regulation, laboratory and research, robotics	Static fatigue tests, weighing calibration, robotics	Aerospace test bed, dynamic fatigue tests, robotics and effectors	Structure testing, crash testing, industrial test benches

Worldwide: Resources

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 invested nearly $180 million to expand our product offering and enrich our technical capabilities through additional strategic acquisitions, including:

- Intersema Sensoric. Low power, MEMS pressure sensors, electronics and custom modules.

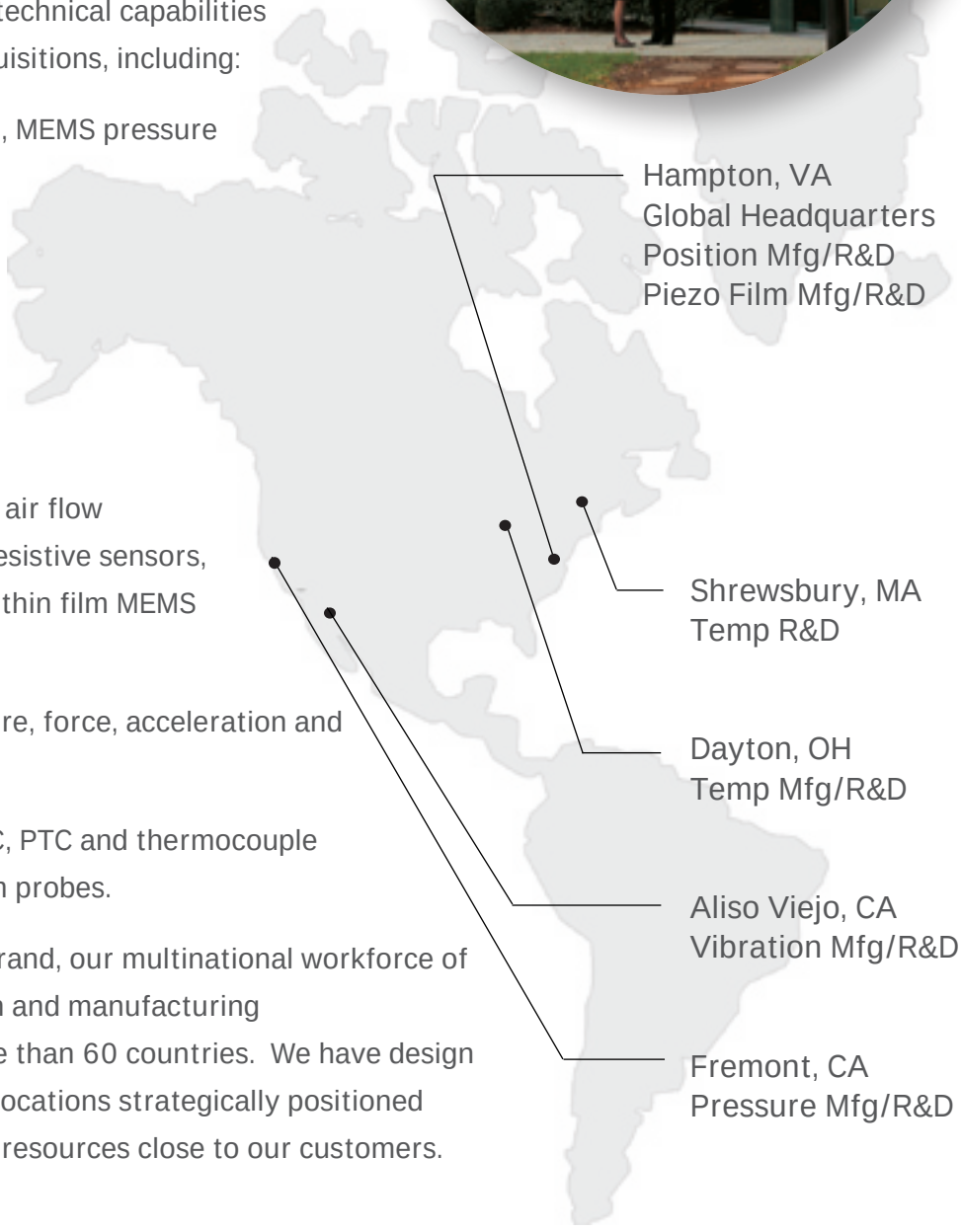
- Humirel. Capacitive humidity sensors and modules, as well as multi-parameter sensing assemblies.

- 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 2500+ 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.



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Various Sensors Mfg/R&D

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

Galway, Ireland
Temperature Mfg/R&D

Les Clayes-Sous-Bois, France
Force - Torque Mfg/R&D
Vibration - Pressure Mfg/R&D

Fontenay Tresigny, France
Temperature Mfg/R&D

Bevaix, Switzerland
Pressure Mfg/R&D

Dortmund, Germany
Position - Temperature Mfg/R&D
Foundry Services

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