

FORCE SENSORS

We are a pioneer in the design and manufacture of precision force sensors for applications that require high performance or unique packaging, including electromechanical flight control, test and measurement and ultra-low cost OEM load cells for medium to high volumes. Based on our proprietary piezoresistive silicon strain gage (Microfused) technology, our sensors combine durability and long-term stability in extremely low cost packages. 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 the autopilot automatic disconnect function and flap jam detection systems. Our OEM and Test and Measurement (T&M) load cells offer custom packaging and electronics with analog or digital outputs, suited for both low and high force environments.



LOAD CELLS

Low Cost OEM



MEAS FX19

Package	Low profile "coin cell" design
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • 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 Linearity & Hysteresis	±1.0% FSO
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Ø25.00 x 29.50 x 8.00
Typical Applications	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



MEAS FS19

Package	Stainless steel housing with flexible PCB
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Low cost • Small size and light weight
Ranges (Lbf)	1, 2, 4, 6
Max. Over-range	2X
Output / Span	100 mV
Combined Linearity & Hysteresis	±1% FSO
Operating Temp.	0°C to 40°C
Dimensions (mm)	Ø9.5 x 3.45
Typical Applications	Infusion pump, load sensing, contact sensing, weighing, household appliances



MEAS FS20

Package	Miniature; drop in replacement for industry standard
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Load cell design operates at very low strains • Not subject to lead die fatigue
Ranges (Lbf)	1.5, 3
Max. Over-range	10 lbf
Output / Span	1.0 to 4.0 V
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temp.	0°C to 70°C
Dimensions (mm)	30.708 x 17.272 x 8.255
Typical Applications	Infusion pumps, contact sensing, medical devices, consumer appliances



MEAS FC22

Package	Plastic housing, button, flange mounting
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Low cost button shape • Essentially unlimited cycle life
Ranges (Lbf)	25, 50, 100
Max. Over-range	2.5X
Output / Span	100 mV, 0.5 to 4.5 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Ø26.00 x 42.00 x 19.50
Typical Applications	Infusion pumps, robotics end-effectors, exercise machines, contact sensing, appliances



MEAS FC23

Package	Stainless steel housing button shape for higher weight loads
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Industry standard low profile all stainless steel design • Resistant to off-axis loads
Ranges (Lbf)	250, 500, 1,000, 2,000
Max. Over-range	1.5X and 2.5X
Output / Span	100 mV
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temp.	-40°C to 85°C
Dimensions (mm)	Ø31.75 x 10.20
Typical Applications	Batch weighing, robotics, assembly line force, printing presses, pumps, winch and hoist

LOAD CELLS

Standard



MEAS ELHM, ELHS

Package	High capacity dual stud or button style
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> Tension and compression or compression only High stability metal foil strain gage (ELHM) High output semiconductor strain gage (ELHS) NIST traceable calibration provided
Ranges N (Lbf)	1K to 50K (200 to 10K)
Max. Over-range	1.5X FS
Output / Span	10 mV (ELHM) 200 mV FSO (ELHS)
Non-linearity	0.3% to 0.5% FSO
Hysteresis	Combined with linearity
Optional Operating Temp.	-50°C to 120°C (ELHM), -20°C to 80°C (ELHS)
Dimensions (mm)	Application dependent
Typical Applications	Robust general purpose, low deflection design, machine tool, linkage forces



MEAS FN1010

Package	Load pin design
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> Keyed anti-rotation slot Bidirectional available Optional watertight construction
Ranges N (Lbf)	10K to 2K (2K to 400K)
Max. Over-range	1.5X FS
Output / Span	±20 mV (4 V; ±5 V; 4 - 20 mA optional)
Non-linearity	±1% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Application dependent
Typical Applications	Crane monitoring, offshore, load-limited devices



MEAS FN3002

Package	Very high capacity dual stud
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> Threaded male fitting Integrated amplifier Optional rod end
Ranges N (Lbf)	10K to 2K (2K to 400K)
Max. Over-range	1.5X FS
Output / Span	±20 mV (4 V; ±5 V optional)
Non-linearity	±0.25% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Assembly forces, tool force, offshore



MEAS FN2420

Package	Very high capacity load button
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> High stiffness Optional load button Optional high level output module
Ranges N (Lbf)	20K to 5K (4K to 1K)
Max. Over-range	1.5X FS
Output / Span	20 mV (4 V; 5 V)
Non-linearity	±0.25% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Calibration presses, robotics and effectors, laboratory and research

Test and Measurement Miniature



MEAS ELAF

Package	Button, dual stud
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> Low cost Small, low profile design Low off-axis response NIST traceable calibration provided
Ranges N (Lbf)	50 to 10K (10 to 2K)
Max. Over-range	2.5X FS
Output / Span	100 mV (0.5 - 4.5 V optional)
Non-linearity	±0.25% FS
Hysteresis	±0.25% FS
Optional Operating Temp.	-40°C to 120°C
Dimensions (mm)	Ø12.70 x 9.53 or 8.80 Ø15.88 x 12.70 or 11.70 Ø31.75 x 10.20
Typical Applications	Theatrical rigging loads, assembly forces, weighing, thrust measurements, product validation testing



MEAS XFC200R

Package	Small diameter load button
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> High stiffness High overload capacity Static and dynamic
Ranges N (Lbf)	2 to 10K (0.4 to 2K)
Max. Over-range	2X to 4X FS
Output / Span	100 mV
Non-linearity	≤ ±0.5% FS
Hysteresis	≤ ±0.5% FS
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Ø10 to Ø16
Typical Applications	Material test, measuring tools, robotics and effectors



MEAS XFL212R

Package	Low profile load button
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> Extremely flat Integrated load button Small diameter
Ranges N (Lbf)	5 to 500 (1 to 100)
Max. Over-range	2X FS
Output / Span	100 mV
Non-linearity	≤ ±0.5% FS
Hysteresis	≤ ±0.5% FS
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Ø12.5 x 3.5
Typical Applications	Dental and biomechanical, surface mount assembly system, production validation test



MEAS XFTC300 Series

Package	Low/high capacity dual stud
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> High stiffness High overload capacity Threaded male / female fitting
Ranges N (Lbf)	2 to 2K (0.4 to 400)
Max. Over-range	2X to 4X FS
Output / Span	100 mV (4 V; ±5 V optional)
Non-linearity	≤ ±0.5% FS
Hysteresis	≤ ±0.5% FS
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Material test, tool forces, robotics end effectors

LOAD CELLS

S-Beam Standard



MEAS FN3030

Package	S-beam
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • Optional rod ends • Optional high level output • Optional high compensation temperature
Ranges N (Lbf)	50 to 100K (10 to 20K)
Max. Over-range	1.5X FS
Output / Span	±20 mV (4 V; ±5 V optional)
Non-linearity	±0.1% FS
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Laboratory and research, process control, customized options



MEAS FN9620

Package	S-beam
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • High accuracy • IP68 • Entry level
Ranges N (Lbf)	500 to 10K (100 to 2K)
Max. Over-range	1.5X FS
Output / Span	±10 mV to ±20 mV
Non-linearity	±0.05% FS
Optional Operating Temp.	-40 to 90°C
Dimensions (mm)	56 x 20 x 60
Typical Applications	Test bed, dynamic fatigue testing, robotics and effectors



MEAS FN3148

Package	S-beam with stops
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • Very high accuracy • High resolution • Mechanical stops
Ranges N (Lbf)	10 to 2K (2 to 400)
Max. Over-range	5X to 100X FS
Output / Span	±20 mV (4 V; ±5 V optional)
Non-linearity	< ±0.05% FS
Optional Operating Temp.	-40°C to 120°C
Dimensions (mm)	Application dependent
Typical Applications	Product validation tests, medical instruments, weighing



MEAS FN7110

Package	Dual S-beam range
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • High resolution • Optional high level output • Double range
Ranges N (Lbf)	10, 100 to 1K, 10K (2, 20 to 200, 2K)
Max. Over-range	1.2X FS of the higher range
Output / Span	±20 mV (4 V; ±5 V optional)
Non-linearity	±0.1% FS of each range
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	60 x 30 x 100
Typical Applications	Product validation tests, process control, robotics and effectors

Low Profile and Pan-cake



MEAS FMT

Package	Washer
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • High stiffness • 1.5X over-range • High temperature
Ranges N (Lbf)	20K to 320K (4K to 64K)
Max. Over-range	1.5X FS
Output / Span	15 to 20 mV
Non-linearity	1 to 5% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-40°C to 150°C
Dimensions (mm)	Application dependent
Typical Applications	Robotics, process control, bolt clamping for bridges



MEAS FN3050, FN3000

Package	Pan-cake
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • High stability • All FN3050 have same housing • Optional high level output
Ranges N (Lbf)	100 to 1000K (20 to 200K)
Max. Over-range	1.5X FS (10X FS with stops)
Output / Span	15 to 20 mV (4 V; ±5 V optional)
Non-linearity	±0.1% FS
Hysteresis	±0.1% FS
Optional Operating Temp.	-40°C to 150 °C
Dimensions (mm)	Application dependent
Typical Applications	Static fatigue tests, laboratory and research, robotics



MEAS FN9630, FN9635

Package	Very high accuracy pan-cake
Operating Mode	Tension and compression
Unique Features	<ul style="list-style-type: none"> • High stability • High accuracy • Minimal cross effect • Connection flange supplied (FN9635)
Ranges N (Lbf)	10K to 200K (2K to 40K)
Max. Over-range	1.5 x FS
Output / Span	20 mV
Non-linearity	±0.08% FS
Hysteresis	±0.08% FS
Optional Operating Temp.	-40°C to 90°C
Dimensions (mm)	Application dependent
Typical Applications	Static fatigue tests, weighing calibration, robotics



MEAS FN7325

Package	Custom design and ranges available upon request
Operating Mode	Multiaxial force and torque
Unique Features	<ul style="list-style-type: none"> • Measures load and torque in 3 directions • Fatigue rated • Minimal cross effects
Ranges N (Lbf)	5K to 250K (1K to 50K)
Max. Over-range	1.2X FS
Output / Span	±100 to 150 mV (4 V; ±5 V optional)
Non-linearity	±1% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Application dependent
Typical Applications	Structure testing, crash testing, industrial test benches

AUTOMOTIVE DESIGN AND TEST SENSORS



MEAS FN4055

Package	Seat belt sensor
Operating Mode	Tension
Unique Features	<ul style="list-style-type: none"> • Low operating ranges • Protected against overload • Compatible with most seat belts
Ranges N (Lbf)	100 to 300N (20 to 60)
Max. Over-range	5X FS
Output / Span	20 mV
Non-linearity	±0.25% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-40 to 120 °C
Dimensions (mm)	63.5 x 63.5 x 12.7
Typical Applications	Auto crash testing, tension at the belt receptacle



MEAS FN4070, FN4080

Package	Seat belt buckle sensor
Operating Mode	Tension
Unique Features	<ul style="list-style-type: none"> • High operating ranges • Detachable tongue and cable • Compatible with most seat belts
Ranges N (Lbf)	250 to 50K (50 to 10K)
Max. Over-range	1.5X FS
Output / Span	15 to 20 mV
Non-linearity	±0.5% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Application dependent
Typical Applications	Auto crash testing, tension at the belt receptacle



MEAS FN2317

Package	Hand brake
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Easily installed • Ergonomic design • Fits most vehicles
Ranges N (Lbf)	500 to 1K (100 to 200)
Max. Over-range	1.5X FS
Output / Span	±20 mV (4 V optional)
Non-linearity	±0.5% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	100 x 20 x 15
Typical Applications	Hand brake, test bed



MEAS FN2114, FN2570

Package	Brake pedal
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • High accuracy • Extra flat • Compact • Rugged design
Ranges N (Lbf)	200 to 3K (40 to 600)
Max. Over-range	1.5X FS
Output / Span	15 to 20 mV (4 V optional)
Non-linearity	< ±1% FS (FN2114) < ±2.5% FS (FN2570)
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Application dependent
Typical Applications	Brake pedal, clutch pedal, test bed



MEAS FN7080

Package	Gear stick design
Operating Mode	Multi-axial
Unique Features	<ul style="list-style-type: none"> • Measures force in three directions • Replaces gear knob • Ease of mounting
Ranges N (Lbf)	50 to 500 (10 to 100)
Max. Over-range	1.2X FS
Output / Span	±7.5 mV (4 V; ±5 V optional)
Non-linearity	< ±0.3% FS
Hysteresis	Combined with linearity
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Ø25 spherical
Typical Applications	Change gear force measurement, roughness of material



MEAS FCA7300

Package	Steering wheel adaptable
Operating Mode	Multi-sensing
Unique Features	<ul style="list-style-type: none"> • Dual torque and angle range • Steering velocity measurement • Fits all road vehicles
Ranges N (Lbf)	10 to 200 Nm (7 lbf-ft to 150 lbf-ft)
Max. Over-range	10X FS
Output / Span	±10 V
Non-linearity	±0.1% FS
Hysteresis	±0.1% FS
Optional Operating Temp.	-20°C to 80°C
Dimensions (mm)	Ø195 x 50
Typical Applications	On car road test, truck and buses steering test, armored vehicles steering test



MEAS EL20-S458

Package	Special purpose design optimized for automotive crash test environments
Operating Mode	Seat belt tension
Unique Features	<ul style="list-style-type: none"> • Low mass titanium design for use in high shock environments • Mass optimized to minimize acceleration induced errors during SAE J2570 ATD and ISO 6487 • Optional high level and linearized outputs • Smoothed edge design and optional slotted titanium axles eliminate drag errors and dummy damage • Ultra robust cable is user replaceable
Ranges N (Lbf)	5K and 15K (1,000 and 3,200)
Max. Over-range	2X
Output / Span	10 mV (0.5 to 4.5 V optional)
Non-linearity	1.0% to 3.0% FSO.
Hysteresis	Combined with linearity
Optional Operating Temp.	-40°C to 120°C
Dimensions (mm)	Application dependent
Typical Applications	Seat belt forces, safety and restraint system crash test, parachute tether and riser forces

ELECTRONICS / DISPLAYS



MEAS ARD154

Package	Din rail mountable
Operating Mode	Signal conditioning for wheatstone bridge sensors
Unique Features	<ul style="list-style-type: none"> • Suited for full bridge strain gage sensors • 120 to 10,000 Ohm bridge impedance • ± 10 V analog or 0/4 to 20 mA current output • 2 kHz or 20 kHz max. bandwidth • Calibration pushbutton from 0.1 to 10 mV/V
Ranges N (Lbf)	Application dependent
Output / Span	± 10 V max.; 4 to 20 mA or 0 to 20 mA
Accuracy	0.01% FS
Optional Operating Temp.	-10°C to 60°C
Dimensions (mm)	99 x 17.5 x 112
Typical Applications	Test stands, power plants, manufacturing systems, test and measurement, test bed regulation, automat interfaces



MEAS CPA150

Package	Hand held indicator
Operating Mode	Portable display suited for strain gage type sensors
Unique Features	<ul style="list-style-type: none"> • Suited for 1 or 2 sensors • 7½ digits (± 9999999) • Front panel programming • 45 hour life battery • Calibration pushbutton from 0.1 to 10 mV/V
Ranges N (Lbf)	Application dependent
Output / Span	Display only
Accuracy	$\pm 0.005\%$ FS
Optional Operating Temp.	-10°C to 50°C
Dimensions (mm)	90 x 34 x 152 (3.54 x 1.34 x 5.98)
Typical Applications	Outdoor punctual measurements, test and measurement, portable calibration device



MEAS M210

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



MEAS M905

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