

FORCE SENSORS



LOAD CELLS

Low Cost OEM



FX19

Package	Low profile "coin cell" design
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Low cost, low strain design • Essentially unlimited cycle life
FS Ranges	10 to 200 lbf 50 to 100 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 50°C
Dimensions (mm)	Ø25.00 x 8.00
Typical Applications	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



FX29

Package	Welded miniature compression load cell, Analog and Digital options
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Best price to performance • Designed for unlimited cycles and high over-range
FS Ranges	10 to 100 lbf 50 to 500 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC, Digital (I ² C)
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 50°C
Dimensions (mm)	Ø19.70 x 4.95
Typical Applications	Consumer OEM, exercise machines, physical therapy, vending machines, appliances, pumps, medical devices



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
FS Ranges	500 to 3,000 grams-force 5 to 30 Newton
Max. Over-range	2X FS
Output/Span	100 mV
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	0°C to 40°C
Dimensions (mm)	Ø9.5 x 3.45
Typical Applications	Infusion pump, load sensing, contact sensing, weighing, household appliances



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
FS Ranges	500 to 5,000 grams-force 5 to 50 Newton
Max. Over-range	2.5X FS
Output/Span	0.5-4.5 VDC, 1.0-4.0 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-40°C to 85°C
Dimensions (mm)	30.708 x 17.272 x 8.255
Typical Applications	Infusion pumps, contact sensing, medical devices, consumer appliances



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
FS Ranges	10 to 100 lbf 50 to 500 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-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



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
FS Ranges	50 to 2,000 lbf 250 to 1,000 Newton
Max. Over-range	2.5X FS
Output/Span	100 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1.0% FSO
Operating Temperature	-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

	FMT	FN1010	FN2420	FN3000, FN3050	FN3002
Package	Washer	Load pin design	Very high capacity load button	Pan-cake	Very high capacity dual stud
Operating Mode	Compression	Tension and compression	Compression	Tension and compression	Tension and compression
Unique Features	<ul style="list-style-type: none"> • High stiffness • Clamping and bolt forces • High temperature option 	<ul style="list-style-type: none"> • Keyed anti-rotation slot • Bidirectional available • Optional watertight construction 	<ul style="list-style-type: none"> • High stiffness • Optional load button • Optional high level output module 	<ul style="list-style-type: none"> • High stability • All FN3050 have same housing • Optional high level output 	<ul style="list-style-type: none"> • Threaded male fitting • Integrated amplifier • Optional rod end
FS Ranges	4K to 64K lbf 20K to 320K Newton	2K to 400K lbf 10K to 2,000K Newton	4K to 1000K lbf 20K to 5,000K Newton	20 to 200K lbf 100 to 1,000K Newton	2K to 400K lbf 10K to 2,000K Newton
Max. Over-range	1.5X FS	1.5X FS	1.5X FS	1.5X FS (10X FS with stops)	1.5X FS
Output/Span	±20 mV	±20 mV, 0.5-4.5 VDC, 4-20 mA	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1.5% FS	±1% FS	±0.25% FS	±0.1% FS	±0.25% FS
Operating Temperature	-20°C to 80°C	-20°C to 80°C	-40°C to 150°C	-40°C to 150°C	-40°C to 150°C
Dimensions (mm)	Range dependent	Range dependent	Range dependent	Range dependent	Range dependent
Typical Applications	Robotics, process control, bolt clamping for bridges	Crane monitoring, offshore, load-limited devices	Calibration presses, robotics and effectors, laboratory and research	Static fatigue tests, laboratory and research, robotics	Assembly forces, tool force, offshore

	FN3030	FN3148	FN9620	FN9630, FN9635
Package	S-beam	S-beam with stops	S-beam	Very high accuracy pan-cake
Operating Mode	Tension and compression	Tension and compression	Tension and compression	Tension and compression
Unique Features	<ul style="list-style-type: none"> • Optional rod ends • Optional high level output • Optional high compensation temperature 	<ul style="list-style-type: none"> • Very high accuracy • High resolution • Mechanical stops 	<ul style="list-style-type: none"> • High accuracy • IP68 • Entry level 	<ul style="list-style-type: none"> • High stability & accuracy • Connection flange supplied for model FN9635 • Minimal cross effect
FS Ranges	10 to 20K lbf 50 to 100K Newton	2 to 400 lbf 10 to 2,000 Newton	100 to 2,000 lbf 500 to 10K Newton	2K to 40K lbf 10K to 200K Newton
Max. Over-range	1.5X FS	5X to 100X FS	1.5X FS	3X FS
Output/Span	±20 mV, 0.5-4.5 VDC	±20 mV, 0.5-4.5 VDC	±10 mV to ±20 mV	±20 mV
Combined Linearity & Hysteresis	±0.1% FS	±0.05% FS	±0.05% FS	±0.08% FS
Operating Temperature	-40°C to 150°C	-40°C to 120°C	-40°C to 90°C	-40°C to 90°C
Dimensions (mm)	Range dependent	Range dependent	56 x 20 x 60	Range dependent
Typical Applications	Laboratory and research, process control, customized options	Product validation tests, medical instruments, weighing	Test bed, dynamic fatigue testing, robotics and effectors	Static fatigue tests, weighing calibration, robotics

FORCE LOAD CELLS

Miniature Load Cells



	ELAF	XFC200R	XFL212R	XFTC300	XFU400
Package	Button, dual stud	Small diameter load button	Low profile load button	Low/high capacity dual stud	Miniature rod end
Operating Mode	Tension and compression	Compression	Compression	Tension and compression	Tension and compression
Unique Features	<ul style="list-style-type: none"> • Low cost, small profile • Microfuse technology • Low off-axis response 	<ul style="list-style-type: none"> • High stiffness • High overload capacity • Static and dynamic 	<ul style="list-style-type: none"> • Extremely flat • Integrated load button • Small diameter 	<ul style="list-style-type: none"> • High stiffness • High overload capacity • Threaded male/female fitting 	<ul style="list-style-type: none"> • High stiffness • High accuracy • High temperature
FS Ranges	10 to 2,000 lbf 50 to 10K Newton	0.4 to 2,000 lbf 2 to 10K Newton	1 to 100 lbf 5 to 500 Newton	0.4 to 400 lbf 2 to 2,000 Newton	100 to 1,000 lbf 500 to 5,000 Newton
Max. Over-range	2.5X FS	2X FS	2X FS	2X FS	1.5X FS
Output/Span	±100 mV, 0.5-4.5 VDC	±100 mV	±100 mV	±100 mV, 0.5-4.5 VDC	±100 mV
Combined Linearity & Hysteresis	±0.25% FS	±0.5% FS	±1% FS	±0.5% FS	±0.3% FS
Operating Temperature	-40°C to 120°C	-40°C to 120°C	-40°C to 120°C	-40°C to 150°C	-20°C to 120°C
Dimensions (mm)	Range dependent	Ø10 to Ø16	Ø12.5 x 3.5	Range dependent	Range dependent
Typical Applications	Theatrical rigging loads, assembly forces, weighing, thrust measurements, product validation testing	Material test, measuring tools, robotics and effectors	Dental and biomechanical, surface mount assembly system, production validation test	Material test, tool forces, robotics end effectors	Spherical rod end bearings, engine & suspension testing, machinery equipment

FORCE LOAD CELLS

Multiaxial Load Cells



	FN7110	FN7325
Package	Dual S-beam range	Custom design and ranges available upon request
Operating Mode	Tension and compression	Multiaxial force and torque
Unique Features	<ul style="list-style-type: none"> • High resolution • Optional high level output • Double range 	<ul style="list-style-type: none"> • Measures load and torque in 3 directions, 6DOF total • Fatigue rated • Minimal cross effects
FS Ranges	2 to 2,000 lbf 10 to 10K Newton	1K to 50K lbf 5K to 250K Newton
Max. Over-range	1.2X FS	1.2X FS
Output/Span	±20 mV, 0.5-4.5 VDC	±150 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.1% FS	±1% FS
Operating Temperature	-20°C to 80°C	-20°C to 80°C
Dimensions (mm)	60 x 30 x 100	Range dependent
Typical Applications	Process control, assembly forces, weighing, thrust measurements, product validation testing	Structure testing, crash testing, industrial test benches, robotic joints

FORCE LOAD CELLS

Automotive Load Cells



FN2114

Package	Brake pedal
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • High accuracy • Extra flat • Compact
FS Ranges	40 to 500 lbf 200 to 2,500 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±1% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Range dependent
Typical Applications	Brake pedal, clutch pedal, test bed



FN2317

Package	Hand brake
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • Easily installed • Ergonomic design • Fits most vehicles
FS Ranges	100 to 200 lbf 500 to 1,000 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	100 x 20 x 15
Typical Applications	Hand brake, test bed



FN2570

Package	Brake pedal
Operating Mode	Compression
Unique Features	<ul style="list-style-type: none"> • High accuracy • Compact and extra flat • Rugged, stainless steel design
FS Ranges	40 to 500 lbf 200 to 2,500 Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±2.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	59 x 59 x 12.5
Typical Applications	Brake pedal, clutch pedal, test bed



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
FS Ranges	20 to 60 lbf 100 to 300 Newton
Max. Over-range	10X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±0.25% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	63.5 x 63.5 x 12.7
Typical Applications	Auto crash testing, tension at the belt receptacle



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
FS Ranges	200 to 8,000 lbf 1K to 40K Newton
Max. Over-range	1.5X FS
Output/Span	±20 mV
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Range dependent
Typical Applications	Auto crash testing, tension at the belt receptacle



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
FS Ranges	40 to 100 lbf 200 to 500 Newton
Max. Over-range	1.2X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	< ±0.3% FS
Operating Temperature	-20°C to 80°C
Dimensions (mm)	Ø25 spherical
Typical Applications	Change gear force measurement, roughness of material



EL20-S458

Package	Special purpose seat belt load cell for automotive crash testing
Operating Mode	Seat belt tension
Unique Features	<ul style="list-style-type: none"> • Mass optimized to minimize acceleration induced errors during SAE J2570 ATD and ISO 6487 • Optional high level and linearized outputs • Smoothed design and slotted titanium axles eliminate drag errors and dummy damage
FS Ranges	1,000 to 5,000 lbf 5K to 25K Newton
Max. Over-range	2X FS
Output/Span	±20 mV, 0.5-4.5 VDC
Combined Linearity & Hysteresis	±0.5% FS
Operating Temperature	-40°C to 120°C
Dimensions (mm)	66 x 35 x 16.5
Typical Applications	Seat belt forces, safety and restraint system crash test, parachute tether and riser forces

FORCE LOAD CELLS

Digital Display Meters



ARD154

Package	Din rail mountable
Type	Signal conditioning for wheatstone bridge sensors
No. of Channels	Four
Unique Features	<ul style="list-style-type: none"> • Suited for full bridge strain gage sensors • Test stands and process industries • 2 kHz or 20 kHz max. bandwidth
Output/Span	±10 VDC or 4-20 mA current output
Accuracy	±0.01% FS
Operating Temperature	-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



CPA150

Package	Hand held indicator
Type	Portable display suited for strain gage type sensors
No. of Channels	Two
Unique Features	<ul style="list-style-type: none"> • Suited for 1 or 2 sensors • 45 hour life battery • Calibration pushbutton from 0.1 to 10 mV/V
Output/Span	Display only
Accuracy	±0.005% FS
Operating Temperature	-10°C to 50°C
Dimensions (mm)	90 x 34 x 152
Typical Applications	Outdoor punctual measurements, test and measurement, portable calibration device



M210

Package	Front panel or housed in case
Type	Signal conditioning and display meter
No. of Channels	One
Unique Features	<ul style="list-style-type: none"> • Red LED display: ±2,000 count • High bandwidth: 1,000 Hz at -3 dB • Low noise level
Output/Span	±10 VDC
Accuracy	±0.05% FS
Operating Temperature	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



M905

Package	Front panel or housed in case
Type	Display suited for process or strain gage type sensors
No. of Channels	One
Unique Features	<ul style="list-style-type: none"> • Suited for process or strain gage type sensors • 5 digits: -19999 to 19999 • Front panel programming
Output/Span	±10 VDC or 4-20 mA current output
Accuracy	±15 bits, 20 sample/sec
Operating Temperature	-10°C to 60°C
Dimensions (mm)	96 x 48 x 60
Typical Applications	Display on test bed, monitoring, laboratory and research



121

Package	Bench top
Type	DC amplifier and signal conditioner
No. of Channels	Three
Unique Features	<ul style="list-style-type: none"> • 0.001 to 9999 • Low noise operation with auto-zero • For bridge type sensors • µP controlled, programmable • Low pass filter options
Output/Span	±10 VDC
Accuracy	±0.1% FS
Operating Temperature	0°C to 50°C
Dimensions (mm)	301 x 258 x 102
Typical Applications	Instrumentation labs, test benches, R&D facilities



140A / 142A

Package	Inline amplifier
Type	DC amplifier and auto-zero
No. of Channels	one
Unique Features	<ul style="list-style-type: none"> • ±1.5 mV auto-zero • For bridge type sensor (140A) • For strain gage (142A) • x10, x25, x50, x100, x200 gain • 5 to 30 VDC excitation
Output/Span	0.5-4.5 VDC, ref to 2.5 VDC
Accuracy	±0.5% FS
Operating Temperature	-10°C to 50°C
Dimensions (mm)	56.9 x 25.4 x 12.7
Typical Applications	Instrumentation labs, test benches, R&D facilities