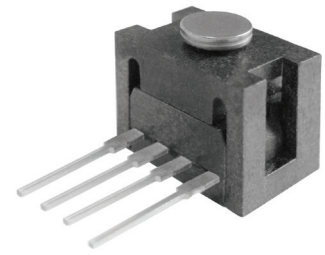


Force Sensors Line Guide



Leadership, in full force. Whether it's critical applications such as IV drips or dialysis, or serious engineering like robotic end-effectors, Honeywell Sensing and Internet of Things (SloT) offers an unbeatable line of force sensor options. These sensors measure the addition or backup of force — meaning, the resistance of silicon-implanted piezoresistors increases when flexed under applied force. Each sensor concentrates force

directly to the silicon-sensing element through a stainless steel plunger, with the amount of resistance changing in proportion to the amount of force applied. This change in circuit resistance results in a corresponding output level. Honeywell SloT force sensors also deliver built-in stability and flexibility to provide enhanced performance in most applications.

FEATURES

FSA Series.

Features: Multiple force ranges
 • Total Error Band: $\pm 5\%$ FSS • Accuracy: $\pm 3\%$ FSS • Ratiometric analog or SPI- or I²C-compatible digital output
 • Fully calibrated and temperature compensated over 5°C to 50°C [41°F to 122°F] • Overforce: 6804 g [15 lb]
 • Supply voltage: 3.3 Vdc typ. or 5.0 Vdc typ. • Low power consumption: 13 mW (analog) or 20 mW (digital) • Excellent part-to-part repeatability • Enhanced reliability • Stable interface plunger
 • Internal diagnostic functions available
 • REACH and RoHS compliant

Benefits: Choice of force ranges maximizes sensitivity and improves system resolution/performance. Total Error Band enhances system performance. Enhanced accuracy includes all errors due to force non-linearity, force hysteresis, and non-repeatability. Digital output enhances performance through reduced conversion requirements and convenience of direct interface to microprocessors. Overforce provides enhanced durability in applications where overforce may exist. Supply voltage provides customers flexibility of design within the application.

Diagnostics functions allow user to determine if sensor is working correctly by detecting if electrical paths are broken or shorted inside the sensor. Potential medical applications include ambulatory non-invasive pump pressure, infusion pumps, kidney dialysis machines, and occlusion detection. Potential industrial applications include load and compression sensing.

FSG Series.

Features: Extremely low deflection (approx. 30 μm typical at Full Scale)
 • Low repeatability error: $\pm 0.2\%$ span
 Low linearity error: $\pm 0.5\%$ span • Low off-center loading errors • Resolution to 0.0098 N • Fast response time
 • Low power consumption • High ESD resistance of 8 kV

Benefits: Extremely low deflection helps reduce measurement error. Low repeatability error improves overall system accuracy. Low linearity error improves system accuracy over the entire force range. Low off-center loading errors improve system accuracy due to mechanical misalignment. Low resolution improves customer's system accuracy. Fast response time allows system to make faster decisions

which may improve system accuracy. Low power consumption allows use in battery applications. High ESD resistance reduces special handling during assembly. Potential medical applications include infusion pumps, ambulatory non-invasive pumps, occlusion detection, kidney dialysis machines, and enteral pumps; potential industrial applications include load and compression sensing, variable tension control, robotic end-effectors, and wire bonding equipment.

FSS Series.

Features: RoHS-compliant materials
 • Low deflection • Direct mechanical coupling • Product rating of 20 million MCTF at 25°C [77°F] (subject to application variation) • Small size
 • Enhanced sensitivity without compromising signal integrity
 • Electrically ratiometric output • Low voltage supply • High resistance to electrostatic discharge (ESD) Classification Level 3B (8 KV) • Sensor output has low sensitivity to many mounting stresses

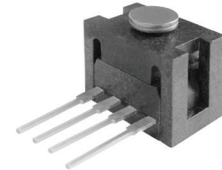
Benefits: RoHS-compliant materials allow use in industries requiring regulation compliance. Low deflection

Force Sensors Line Guide

Your applications, our engineering: A powerful force.

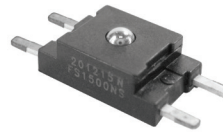
The Honeywell force sensor design incorporates a patented modular construction. What's more, our innovative elastomeric technology and engineered molded plastics result in load capacities of up to 67 N [15 lb] overforce. This unique design also provides a variety of mounting options, including application-specific requirements — plus other valuable benefits: stainless steel ball actuator provides enhanced, stable mechanical performance and application adaptability.

Potential applications for Honeywell SloT force sensors include medical equipment such as infusion and ambulatory non-invasive pumps, occlusion detection, kidney dialysis machines, and enteral pumps. Industrial potential applications include load and compression sensing, variable tension control, robotic end effectors, and wire bonding equipment.



Force Sensors

	FSA Series	FSG Series
Signal conditioning	amplified	unamplified
Technology	silicon die (piezoresistive)	silicon die (piezoresistive)
Output	ratiometric analog SPI- or I ² C-compatible digital	360 mV typ.
Force range	N: 5, 7.5, 10, 15, 20, 25 lb: 1, 1.5, 2, 3, 5 g: 500, 750 kg: 1, 2	0 N to 5 N 0 N to 10 N 0 N to 15 N 0 N to 20 N
Overforce	15 lb [6804 g]	60 N max. (range dependent)
Operating temperature range	0°C to 70°C [32°F to 158°F]	-40°C to 85°C [-40°F to 185°F]
Compensated temperature range	5°C to 50°C [41°F to 122°F]	-
Storage temperature range	-40°C to 85°C [-40°F to 85°F]	-40°C to 100°C [-40°F to 212°F]



Force Sensors

	FSS Series	FSS-SMT Series
Signal conditioning	unamplified	unamplified
Technology	silicon die (piezoresistive)	silicon die (piezoresistive)
Output	360 mV typ.	360 mV typ.
Force range	0 N to 5 N 0 N to 10 N 0 N to 15 N 0 N to 20 N	0 N to 5 N 0 N to 10 N 0 N to 15 N 0 N to 20 N
Overforce	60 N max. (range dependent)	60 N max. (range dependent)
Operating temperature range	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]
Compensated temperature range	-	-
Storage temperature range	-40°C to 100°C [-40°F to 212°F]	-40°C to 100°C [-40°F to 212°F]

Force Sensors



TBF Series Basic

1865 Series

Signal conditioning	unamplified	unamplified
Technology	silicon die (piezoresistive)	silicon die (piezoresistive)
Output	mV	current excitation: 100 mV typ. voltage excitation: 40 mV typ.
Pressure range	1 bar to 10 bar 100 kPa to 1 MPa 15 psi to 150 psi	0 psi to 5 psi 0 psi to 10 psi 0 psi to 15 psi 0 psi to 25 psi 0 psi to 30 psi
Overpressure	17 bar max. (range dependent) 1.70 MPa max. (range dependent) 245 psi max. (range dependent)	60 psi max. (range dependent)
Operating temperature range	0°C to 50°C [32°F to 122°F]	-28°C to 54°C [-18°F to 129°F]
Compensated temperature range	0°C to 50°C [32°F to 122°F]	-1°C to 54°C [30°F to 129°F]
Storage temperature range	-40°C to 125°C [-40°F to 257°F]	-28°C to 54°C [-18°F to 129°F]

Honeywell



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