Honeywell

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 Control (S&C) offers an unbeatable line of force sensor options. These sensors measure the addition or backup of force — meaning, the resistance of silicon-implanted piezoresistors will increase 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 mV output level. Honeywell S&C force sensors also deliver built-in stability and flexibility, to provide enhanced performance in most applications.

FEATURES

FORCE SENSORS

FSG Series.

Features: Extremely low deflection (approx. 30 µm typical at Full Scale) • Low repeatability error (±0.2% span) Low linearity error (±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 helps reduce measurement error. Direct mechanical coupling of the actuation ball to the sense element reduces coupling errors and keeps mechanical hysteresis to a minimum. 20 million MCTF provides for consistent output over time and reduces repairs or replacements. Small size minimizes space on the PCB. Enhanced sensitivity results in low system noise and reduced measurement errors. Electrically ratiometric output accommodates supply voltage variations, leading to low ratiometricity error. Low voltage supply allows for use in many battery powered applications. High resistance to electrostatic discharge reduces special handling during assembly. Sensor output has low sensitivity to many mounting stresses. 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.

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Your applications, our engineering: A powerful force.
The Honeywell S&C 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 60 N 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 S&C 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	FSG Series	FSS 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]
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	1865 Series	FS01/FS03 Series
Signal conditioning	calibrated	amplified
Technology	silicon die (piezoresistive)	silicon die (piezoresistive)
Output	current excitation: 100 mV typ. voltage excitation: 40 mV typ.	3 Vdc
Force range	0 psi to 5 psi 0 psi to 10 psi 0 psi to 15 ps 0 psi to 25 psi 0 psi to 30 psi	0 kg to 0.68 kg [0 lb to 1.5 lb] 0 kg to 1.36 kg [0 lb to 3.0 lb]
Overforce	60 psi max. (range dependent)	7 lb
Operating temperature range	-28 °C to 54 °C [-18 °F to 129 °F]	0 °C to 70 °C [32 °F to 158 °F]
Storage temperature range	-1 °C to 54 °C [30 °F to 129 °F]	5 °C to 50 °C [41 °F to 122 °F]

Force Sensors

	FSS-SMT Series
Signal conditioning	unamplified
Technology	silicon die (piezoresistive)
Output	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
Overforce	60 N max. (range dependent)
Operating temperature range	-40 °C to 85 °C [-40 °F to 185 °F]
Storage temperature range	-40 °C to 100 °C [-40 °F to 212 °F]

FSS-SMT Series.

Features: Surface Mount Technology • RoHS-compliant materials • Low deflection (approx. 30 µm typical at full scale) • Direct mechanical coupling of the actuation ball to the sense element • 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: Surface Mount Technology allows for automated assembly and may eliminate hand soldering. RoHS-compliant materials allow use in industries requiring regulation compliance. Low deflection helps reduce measurement error. Direct mechanical coupling of the actuation ball to the sense element reduces coupling errors and keeps mechanical hysteresis to a minimum. 20 million MCTF for consistent output over time and reduces repairs or replacements. Small size minimizes space on PCB. Enhanced sensitivity results in low system noise and reduces measurement errors. Electrically ratiometric output accommodates supply voltage variations, leading to low ratiometricity error. Low voltage supply allows for use in many battery powered applications. High resistance to ESD reduces special handling during assembly. Sensor output has low sensitivity to many mounting stresses. Potential medical applications include infusion pumps, ambulatory non-invasive pumps, occlusion detection, kidney dialysis machines, enteral pumps; and potential industrial applications such as load and compression sensing, variable tension control, robotic end-effectors, and wire bonding equipment.

1865 Series.

Features: Silicon pressure/force interface diaphragm • Force measurement for potential infusion pump applications • Pressure measurement for liquid media • Medical-grade materials • 8-pin DIP electrical connection • Laser trimmed • Choice of voltage or constant current excitation • Temperature compensated

Benefits: Enhanced performance force/pressure transducers specifically designed to address needs of potential medical and specialized OEM applications such as infusion and syringe pumps, blood pressure equipment, and drug delivery systems. Reliable replacement for older force or load cell transducers. Silicon rubber diaphragm allows sensor to be compatible with some potential liquid media applications. Laser-trimmed compensation may be specified to operate with a constant current or voltage supply.

FS01/FS03 Series.

Features: High-level output range • Temperature compensated • Calibrated zero and span • Zero noise

Benefits: Piezoresistive-based force sensor for potential applications including medical infusion pumps, ambulatory noninvasive pump pressure, occlusion detection, and kidney dialysis machines. High-level voltage output, calibrated, and temperature compensated sensors give accurate and stable output over temperature range. Features integrated circuit sensor element and laser-trimmed thick-film ceramic in a small plastic housing. Provides enhanced corrosion resistance and isolation to external package stress.

Warranty. Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847
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008151-4-EN
February 2013