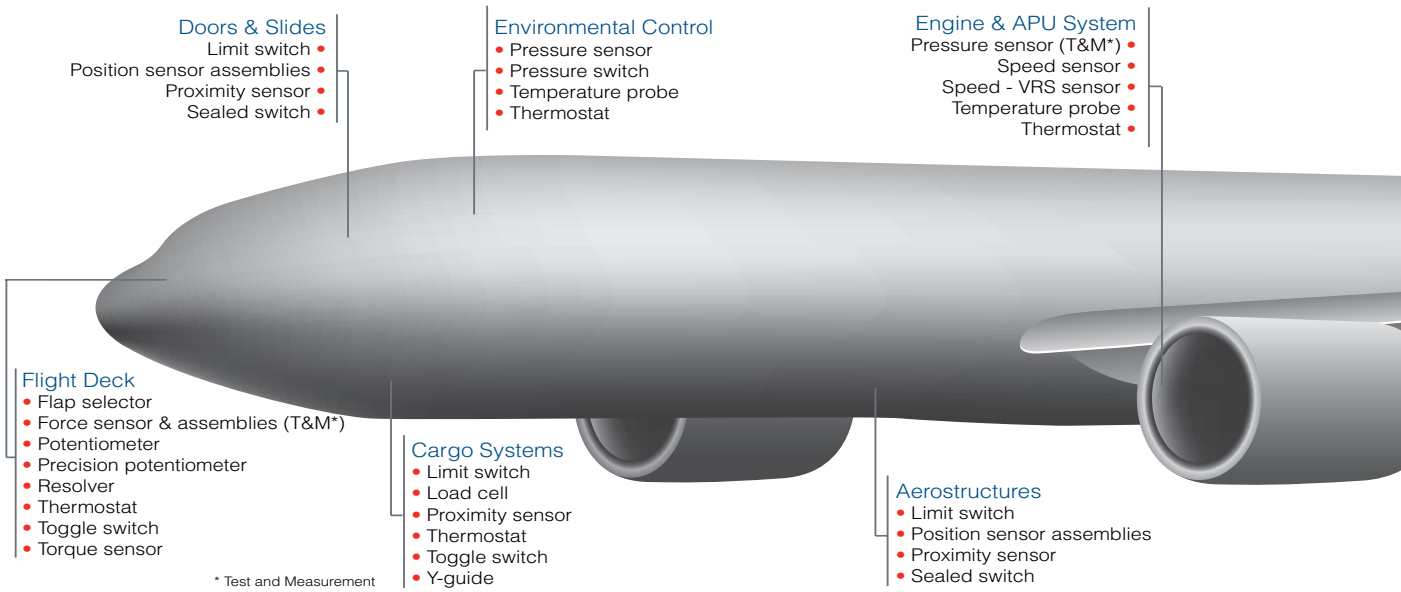
Aerospace & Defense Products

Honeywell

SENSING AND CONTROL

Product Range Guide

Commercial and Business Aircraft



Honeywell Sensing and Control (S&C) is an industry leader with a broad portfolio of sensing, switching, and assembly solutions. With over 50 year's experience designing and delivering aerospace products, Honeywell's core skills include engineering, sensor development, analog/digital electronics, and environmental packaging. Part and assembly customization is Honeywell Sensing and Control's strength.

Honeywell can:

- **Deliver electrical and mechanical designs quickly** for build-to-print, redesign, new design, and/or testing purposes
- **Integrate features** such as gearing, redundant channels, environmental sealing, and more
- **Create designs** that are retrofittable while reducing component count (weight savings)
- **Meet demanding schedules** with application knowledge, world-class engineering, and global manufacturing facilities
- **Certify and qualify products in-house**, delivering fully compliant reports with all the required documentation
- **Offer customer support** throughout the design process, into production, and beyond

We are a long-term partner.

Honeywell maintains relevant approvals: ISO 9000; 2000; AS 9100; QS 9000; EASA21 subpart G; EASA 145; ISO 14000; FAA-certified Repair Station; JAA-certified Repair Station.

Primary Flight Controls
- Limit switch
- RVDTs
- Thermostat

Secondary Flight Controls (High-lift system)
- Position sensor assemblies
- Proximity sensor
- RVDTs
- Resolver

Airframe & Engine Testing
- Force sensor (T&M*)
- Pressure sensor (T&M*)
- Torque sensor (T&M*)
- Wireless data telemetry (T&M*)

Landing Gear, Wheels & Brakes
- Limit switch
- Load cell
- Position sensor assemblies
- Pressure sensor (T&M*)
- Proximity sensor
- RVDT
- Sealed switch
- Speed sensor
- Speed - VRS sensor
- Thermostat

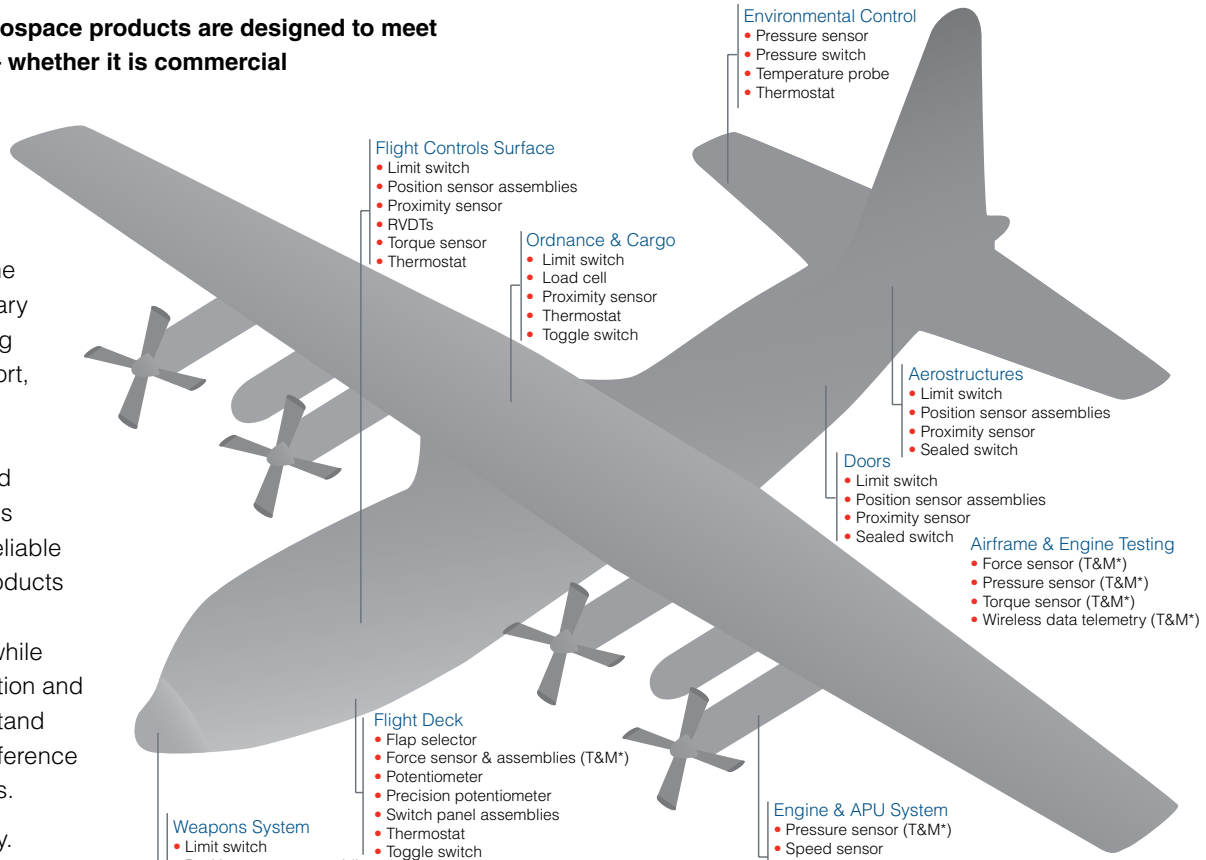
Honeywell Sensing and Control is a leading supplier to engine and auxiliary power unit (APU) manufacturers for fuel, air, and lubrication systems with a wide range of products to meet the needs of on-engine sensing and interface for FADEC/DEEC control systems.

- Temperature sensors
- Pressure transducers
- Position transducers
- Speed sensors
- Oil level sensors
- Pressure and level switches
- Accelerometers

These products are also used in engine valves and hydraulic systems: position and pressure sensing products offering enhanced reliability and temperature/vibration performance; built-in test options for vital applications. Honeywell S&C engineers have industry-wide expertise in the design and integration of switch and sensor assemblies for engine control systems.

Military Aircraft

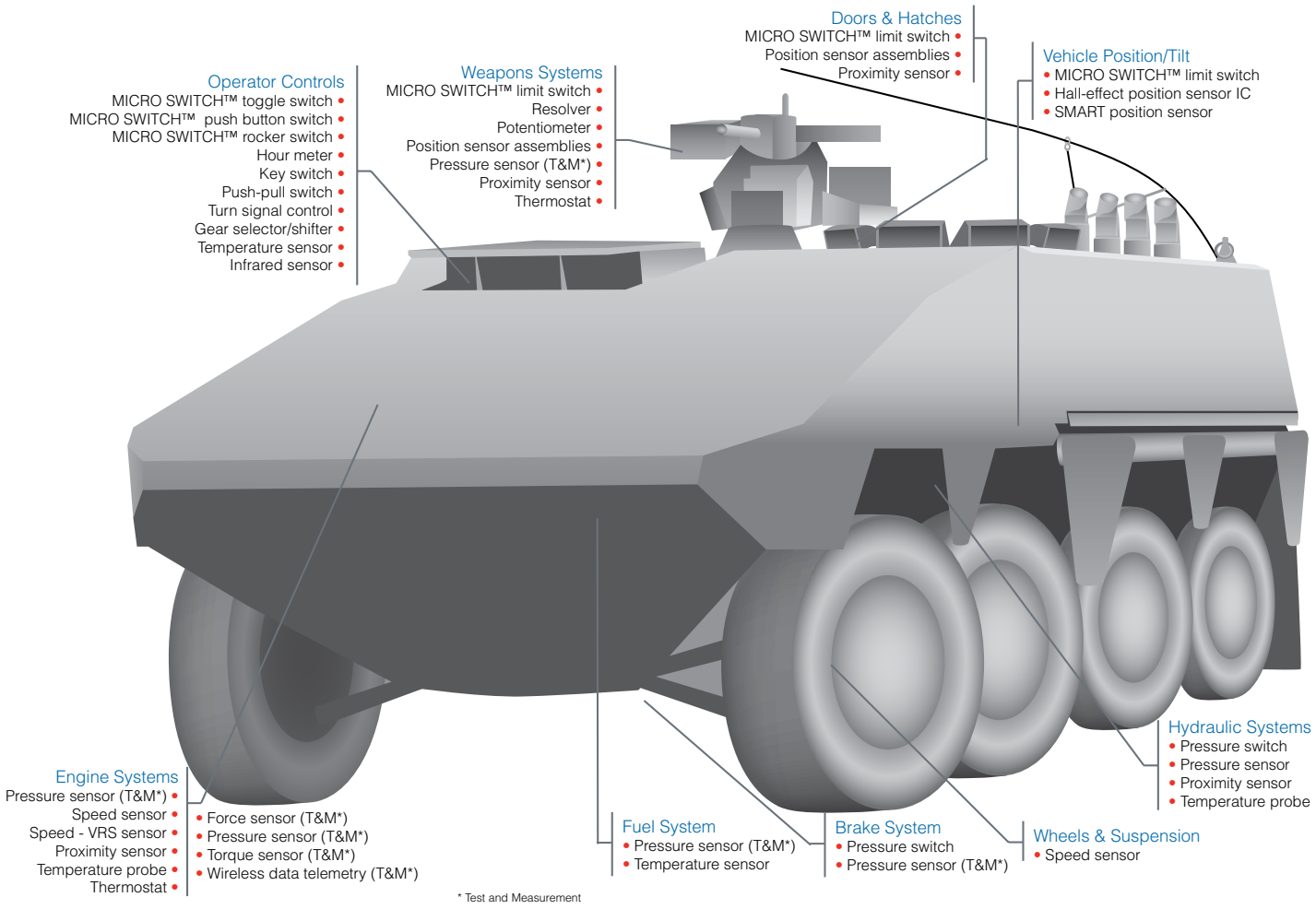
Honeywell aerospace products are designed to meet challenges – whether it is commercial industry standard or unique high performance environments. Honeywell's engineers focus on the requirements for military applications, including pilot safety and comfort, smooth and accurate flight control, weapon systems reliability, and additional applications that demand highly reliable performance. Our products perform over extreme temperature ranges while enduring heavy vibration and shock, and can withstand electromagnetic interference and voltage transients.



Again, reliability is key. For military applications, consequences can be dire. Many S&C products are crucial to aircraft operation and carry MTBF (mean time between failure) beyond 200,000 hours. Honeywell can:

- **Provide a strong, supporting infrastructure** with many years of on-time aerospace delivery experience
- **Deliver configurable designs**. From simple packaged sensors to multi-function integrated assemblies, Honeywell S&C can provide a solution
- **Create integrated assemblies** by providing sensing solutions to the aerospace industry by designing and delivering fully sealed, qualified products complete with a connector and mounting
- **Manufacture rugged solutions**. Field data proves Honeywell designs stand up to the rigors of pressure cycling, wash-down, temperature extremes, and high vibration

Military Ground Vehicles



* Test and Measurement

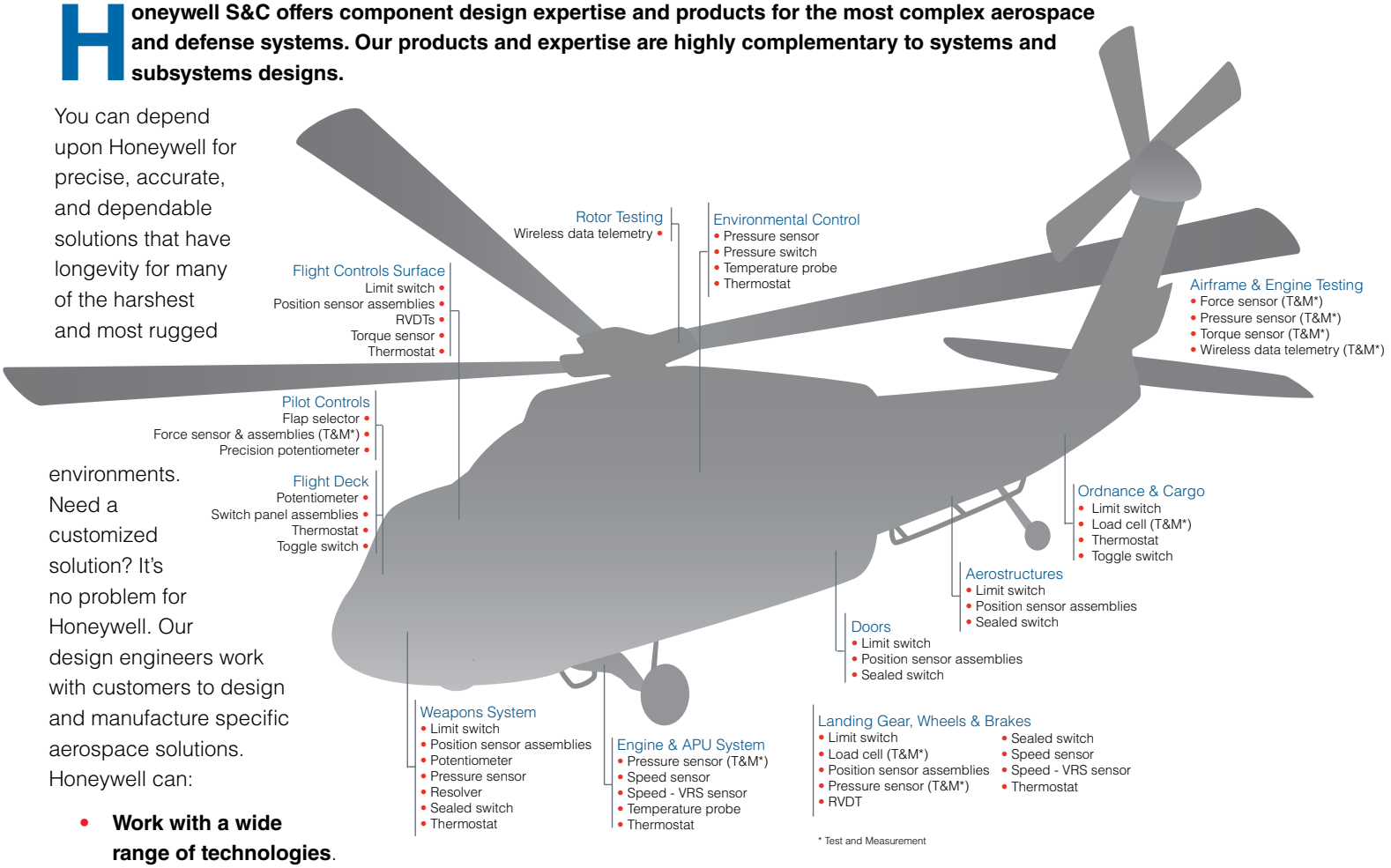
Suited for harsh environments... when crews are under fire, they should never have to think twice about whether their systems will work properly. With Honeywell sensors, switches, and custom controls, users know they are getting the performance levels required for each application.

Honeywell military-specified position sensing and temperature products monitor an armoured vehicle's gun control and ammunition loading systems. Resolvers and proximity sensors provide highly precise position feedback and extremely fast switching frequency for optimal gun system control. Temperature monitoring promotes a safe environment for optimal firing rate.

Rotorcraft

Honeywell S&C offers component design expertise and products for the most complex aerospace and defense systems. Our products and expertise are highly complementary to systems and subsystems designs.

You can depend upon Honeywell for precise, accurate, and dependable solutions that have longevity for many of the harshest and most rugged environments. Need a customized solution? It's no problem for Honeywell. Our design engineers work with customers to design and manufacture specific aerospace solutions. Honeywell can:



* Test and Measurement

- **Work with a wide range of technologies**. We offer RVDT, LVDT, resolver, synchro, metal-foil strain gage, high gain thick film gage, and spring-LVDT, potentiometer, and switches as standard sensing elements – the most accepted in the industry. Honeywell S&C has built an unmatched sensing technology portfolio to solve customers' application challenges.
- **Deliver fully interchangeable and integral signal conditioning**. Our linear force measurement products include integrated signal conditions to meet the interface needs of the system. Optional signal conditioning provides calibration and compensation to allow interchangeability of products without the need for re-calibrating the system.

Weapon Systems

Honeywell components are utilized in military vehicles, aircraft, and launchers to optimize and control weapon systems. Field data proves that Honeywell designs stand up to the rigor of pressure cycling, wash-downs, temperature extremes, and high vibration. They must function correctly every time. There's no margin for error.

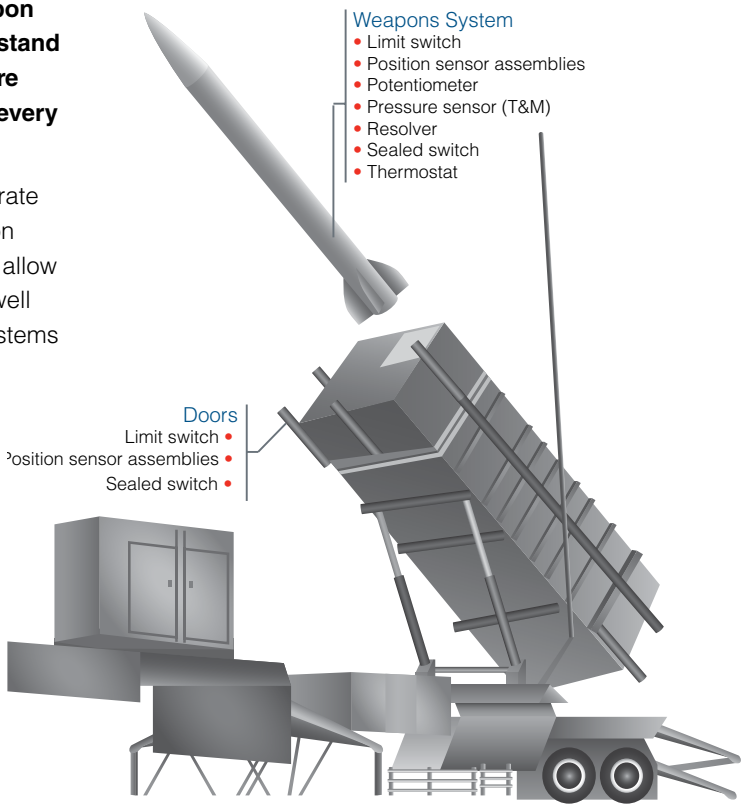
Subsystem interfacing expertise is apparent in our highly accurate and reliable sensors, switches, and control products for weapon systems. Honeywell position sensors in the seeker mechanism allow the system to interpret location in real time. In addition, Honeywell components feature design flexibility and the reuseability of systems on different platforms.

Resolvers deliver non-contact, 360° sensing, along with enhanced accuracy, resolution, and repeatability under severe environmental conditions.

Honeywell precision potentiometers deliver real-time information to a missile guidance system while the missile is en route, providing reliable directional control to the control surfaces. In addition, Honeywell has position sensors in the seeker mechanism that allow the system to interpret the location in real-time.

Honeywell S&C products are often used in the following weapon system applications:

- Gun aiming systems
- Multiple-launched rocket systems
- Precision pointed systems
- Common Remotely Operated Weapon System (CROWS)
- Lasers
- Integrated assemblies



Aerospace & Military Products
MICRO SWITCH™ Sealed Switches

Military performance standard and most global approvals. Environmental and hermetic sealing to resist many severe environment conditions, changes in atmospheric pressures/ temperatures. Potential applications include aircraft landing gear and flap/stabilizer controls, de-icers, doors/slides, engine thrust reversers, space vehicles, armored personnel carriers, weapon systems, and wingfold actuators.

Series	MICRO SWITCH™ SE/XE	MICRO SWITCH™ HM	MICRO SWITCH™ HS
Type	anodized aluminum snap-action switch	stainless steel snap-action switch	stainless steel, phenolic snap-action switch
Sealing	MIL-PRF-8805, symbol 3	MIL-PRF-8805, symbol 5 hermetic	MIL-PRF-8805, symbol 5 hermetic
Operating temperature range	-53 °C to 105 °C [-65 °F to 221 °F]	-65 °C to 121 °C [-85 °F to 250 °F] high temp available: 500 °F	-54 °C to 121 °C [-65 °F to 250 °F]
Actuators/levers	auxiliary actuators available	integral lever; aux. actuators: leaf, roller leaf, straight, roller lever	integral lever
Termination	solder, leadwire	solder, leadwire	screw, leadwire
Circuitry	SPDT	SPDT	SPDT
Contacts	silver, gold, bifurcated gold	silver, gold, bifurcated gold	silver
Amp rating	7 A max.	0.5 A to 3 A	1 A to 25 A
Approvals	CE, UL/CSA, MIL-PRF-8805 (selected listings)	MIL-PRF-8805	UL, CSA, MIL-PRF-8805
Measurements	SE: 19,05 mm H x 8,64 mm W x 22,35 mm L [0.75 in H x 0.34 in W x 0.88 in L] XE: 19,05 mm H x 8,13 mm W x 15,75 mm L [0.75 in H x 0.32 in W x 0.62 in L]	12,7 mm H x 6,35 mm W x 20,3 mm L [0.5 in H x 0.25 in W x 0.8 in L]	25,4 mm H x 17,8 mm W x 50,8 mm L [1.0 in H x 0.7 in W x 2.0 in L]
Features	watertight and military standard construction per MIL-PRF-8805; corrosion-resistant aluminum housing	hermetically sealed per MIL-S-8805; high temperature construction; reduced sensitivity to changes in altitude or pressure	hermetically sealed per MIL-S-8805; high temperature construction; reduced sensitivity to changes in altitude or pressure

MICRO SWITCH™ EN	MICRO SWITCH™ HE	MICRO SWITCH™ HR	E1-217 Series
military-grade stainless steel with environmental seals limit switch	hermetically sealed stainless steel limit switch	hermetically sealed stainless steel limit switch	military-grade limit switch
MIL-PRF-8805, symbol 4 hermetic	MIL-PRF-8805, symbol 5 hermetic	MIL-PRF-8805, symbol 5 hermetic	MIL-S-8805
-55 °C to 85 °C [-65 °F to 185 °F]	-55 °C to 125 °C [-67 °F to 257 °F]	-65 °C to 315 °C [-85 °F to 600 °F]	-55 °C to 82 °C [-67 °F to 180 °F]
top plunger, top roller, top rotary	top plunger, top roller plunger, nylon button	top plunger, top roller plunger	various
screw, leadwire, leadwire with connector, pin receptacle, side receptacle	screw, leadwire, bottom receptacle	screw, leadwire (receptacle termination available)	various
SPDT, DPDT	two or four SPDT circuits	SPNO, DPDT	SPDT, snap-action
silver, gold	silver, gold	silver, gold	silver, gold
1 A to 15 A (resistive	1 A, 5 A, 7 A (resistive)	5 A (resistive)	7 A (resistive)
MIL-PRF-8805 symbol 4 hermetic (MIL-PRF-8805 QPL listings available)	MIL-PRF-8805, symbol 5 hermetic	MIL-PRF-8805, symbol 5 hermetic	MIL-S-8805
bottom receptacle: 114,3 mm H x 25,4 mm dia [4.5 in H x 1.0 in dia] side receptacle: 57,2 mm H x 26,7 mm W x 58,9 mm L [2.25 in H x 1.05 in W x 2.32 in L]	top pin plunger: 60,1 mm H x 25,4 mm dia [2.36 in H x 1.0 in dia] top roller plunger: 32,8 mm H x 17,5 mm dia [1.29 in H x 0.69 in dia]	screw termination: 80,8 mm H x 25,4 mm dia [3.18 in H x 1.0 in dia] leadwire termination: 103,7 mm H x 27,0 mm dia [4.08 in H x 1.06 in dia]	48 mm H x 21,5 mm W x 40,2 mm L [1.89 in H x 0.85 in W x 1.58 in L]
top & roller plunger actuators have internal ice scraper ring	features true hermetic sealing (metal-to-metal, glass-to-metal construction); meets sand and dust, explosion, icing, minimum current, and moisture resistance requirements; top & roller plunger actuators have internal ice scraper ring	meets moisture resistance, explosion, and salt spray requirements; top plunger actuator has internal ice scraper ring	small size and lightweight, without sacrificing performance or electrical capacity

Aerospace & Military Products
MICRO SWITCH™ Toggle Switches

Hermetic and environmentally sealed toggle switches offer reliable operations with MICRO SWITCH™ technology. Often used in applications where a panel-mount switch with an environment-proof rating is needed, including military and commercial aviation and process control.

Series	AT	TW	ET	TL
Type	stainless steel toggle	miniature stainless steel toggle	magnetically held toggle	military-grade toggle
Sealing	MIL-S-8805/26/98	qualified to MIL-S-83781	most listings qualified to MIL-S-5594	qualified to MIL-S-3950
Operating temp.	various	-65 °C to 71 °C [-85 °F to 160 °F]	-65 °C to 71 °C [-85 °F to 160 °F]	-65 °C to 71 °C [-85 °F to 160 °F]
Actuator/lever	standard, locking, tab, special design	standard, locking, special design, tab	standard, pull/push-to-unlock, tab	standard, special design, tab, paddle, none
Action	2-position, momentary & maintained	2- or 3-position, momentary & maintained	2- or 3-position, momentary & maintained	2- or 3-position, momentary & maintained
Mounting	15/32 in bushing, 1/4 in bushing, 3-hole, above panel	bushing 15/32 in or 1/4 in	bushing 15/32 in	bushing 15/32 in
Termination	solder, solder T2, screw, quick connect, leadwire, H58	IWTS, solder, screw, quick connect, H58, T2	screw, leadwire, turret	IWTS, solder, screw, quick connect, leadwire
Circuitry	SPDT, DPDT, DPNO, 3PDT, 4PDT, 6PDT, 7PDT, 8PDT, 10PDT	SPST, SPDT, DPST, DPDT	SPDT, DPDT, 4PDT	SPST, SPDT, DPST, DPDT, 3PST, 3PDT, 4PST, 4PDT
Contacts	silver, gold	silver alloy, gold-plated	silver alloy, gold-plated	silver alloy, gold-plated
Amp rating	0.01 A to 5 A (resistive)	0.1 A to 5.0 A @ 0.5 Vdc to 28 Vdc; 0.1 A to 5.0 A @ 0.5 Vac to 115 Vac	7 A max. (resistive)	up to 20 A (resistive)
Measurements	various	49,78 mm H x 14,61 mm W x 14,61 mm D [1.96 in H x 0.575 in W x 0.575 in D]	51,56 mm H x 25,4 mm W x 25,4 mm D [2.03 in H x 1.0 in W x 1.0 in D]	26,7 mm H x 33,5 mm W x 22,6 mm D [1.05 in H x 1.32 in W x 0.89 in D]
Approvals	qualified to MIL-S-8805/26/98	UL, qualified to MIL-S-83781	qualified to MIL-S-5594	UL, CSA, CE, qualified to MIL-S-3950
Features	choice of sealed bushing; short behind panel depth	saves space and weight; sealed bushing versions	holding coil replaces mechanical holding mechanisms to maintain toggle in operate	environment-proof sealing; qualified to MIL-DTL-3950

Aerospace & Military Products
MICRO SWITCH™ Limit Switches

Available with a variety of actuators, electrical specifications, terminations, circuitries and sealing ratings, Honeywell's MICRO SWITCH™ limit switches offer superior flexibility and performance. These precision snap-action switches — sealed in rugged housings — are used to detect presence or absence in areas where physical contact is allowed.





Series	914CE	LS	BZE6/V6	GLA	HDLS
Housing type	–	compact/non-plug-in, plug-in	split housing, side mount; split housing, flange mount	EN 50041	HDLS plug-in and non-plug-in
Sealing	IP65, IP66; NEMA 1, 3, 4, 6, 6P, 12, 13	NEMA 1, 3, 4, 6, 13	NEMA 1, 3, 4, 12 E6/V6-RQ: IP40; NEMA 1 E6/V6-RN: IP66; NEMA 1, 3, 4	IP67; NEMA 1, 3, 4, 12, 13	IP65/66/67; NEMA 1, 3, 4, 4X, 6, 6P, 12, 13
Temperature range	0 °C to 70 °C [35 °F to 160 °F]	-29 °C to 71 °C [-20 °F to 160 °F]	-32 °C to 71 °C [-25 °F to 160 °F]	-25 °C to 85 °C [-13 °F to 185 °F] side rotary: -40 °C to 85 °C [-40 °F to 185 °F]	-12 °C to 93 °C [10 °F to 200 °F]
Housing material	zinc die-cast	zinc die-cast	zinc die-cast	zinc die-cast	zinc die-cast
Actuators/ levers	side rotary, top plunger, roller, pushbutton, wobble	side rotary, roller arm	top plunger, maint. with reset plunger; lever actuated; wobble	side rotary, top plunger, top roller, wobble	top plunger, top roller, top rotary, side rotary, side plunger, side rotary, wobble
Termination	cable, micro-connector	0.5 in - 14NPT conduit, mini-connector	0.5 in - 14NPT (or NPSM) conduit, mini-connector, cable	0.5 in - 14NPT conduit, 20 mm, PG13.5	0.5 in/0.75 in - 14NPT conduit; 20 mm conduit; PG13.5; 12 ft cable; 4, 5, and 9-pin mini-connector
Approvals	UL, CE, CSA, IEC947-5-1, EN60947-5-1	UL, CSA	UL, CSA	UL, CE, CSA, CCC, IEC 947-5-1, EN60947-5-1, UL508	UL, CE, CSA, CCC, EN60947-1, EN60947-5-1
Circuitry	SPDT, SPSTNC, SPDTMBB, SPDTBBM	SPDT double break, DPDT double break	SPDT, DPDT	SPDT snap action DB, SPDT slow action BBM/ MBB, DPDT snap action DB, 2NO and 2NC	1NC 1NO SPDT, 1NC direct acting; 2NC 2NO DPDT, 2NC 2NO DPDT sequential
Contacts	silver, gold	silver, gold	silver	silver, gold	silver, gold
Amp	5 A (thermal)	10 A	10 A or 15 A	10 A (thermal)	10 A (thermal)
Measure-ments (H x W x D)	49 mm x 40 mm x 16 mm [1.93 in x 1.58 in x 0.63 in]	102,9 mm x 30,2 mm x 28,7 mm [4.05 in x 1.19 in x 1.13 in]	63,5 mm x 25,4 mm x 77,2 mm [2.50 in x 1.00 in x 3.04 in]	82,0 mm x 42,0 mm x 42,0 mm [3.23 in x 1.65 in x 1.65 in]	106,7 mm x 29,4 mm x 44,4 mm [4.20 in x 1.16 in x 1.75 in]
Features	rugged housing; miniature size; direct-acting contacts available; pre-leaded or various quick-connect terminations	mode of operation is field adjustable; variety of operating characteristics	rugged electrostatic, epoxy-coated housing; booted versions sealed to IP66; unsealed actuators sealed to IP40; side or flange mount; low temperature options	direct-acting NC contacts	wide variety of actuators, circuitry options, and connectivity

Aerospace & Military Products
MICRO SWITCH™ Pushbutton Switches

Lighted or unlighted, pushbuttons are designed to enhance manual operation with a flexible and attractive interface. Snap-in surface products are easy to apply, operate, and maintain. Often used in control boards and panels found in instrumentation, flight decks, and test equipment.

Series	AML	PB
Housing type	non-lighted, rectangle; 1 lamp circuit, rectangle; 2 lamp circuits, rectangle	equipped with HM hermetically sealed switch units that have metal-to-metal fusion around cover, actuator base, and mounting holes
Circuitry	SPST, SPDT, DPST, DPDT, 4PDT	2-pole, 3-pole, 4-pole
Action	2 position, 3 position (momentary or maintained action)	–
Mounting	snap-in panel	threaded bushing
Sealing	–	panel-seal version, hermetically sealed switch units
Termination	solder, quick connect, printed circuit, push-on	solder, H58, quick-connect
Ampere/voltage range	0.4 A to 2 A @ 0.5 Vdc to 30 Vdc; 0.4 A to 3 A @ 0.5 Vac to 125 Vac; 0.4 A to 2 A @ 0.5 Vac to 250 Vac	2 A to 5 A, 125/250 Vac
Light (if applicable)	no lamp installed; incandescent 6 V, 14 V, 28 V; neon	–
LED/neon color	red, yellow, green	–
Measurements	panel area: 20,5 mm x 30,5 mm [0.80 in x 1.20 in]	various
Approvals	–	UL, CSA External parts corrosion-resistant per MIL-S-8805; meets explosion-proof requirements of MIL-S-8805
Features	silver and gold contacts; available with or without diode protection for LEDs; lamp circuit independent of switch circuit	up to four poles; compact or miniature sizes; sealed versions available

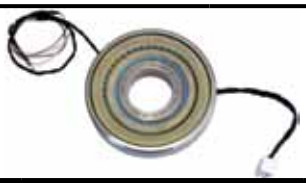
Aerospace & Military Products
Resolvers

Variable transformers in which both rotor and stator usually have two phase windings mechanically displaced by 90°. Typically sine and cosine channel outputs. Provide non-contact measurement for 360° sensing, enhanced accuracy, resolution, and repeatability under severe environmental conditions. Often used in ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position applications.



Series	Cased - Brushless Dual Speed	Cased - Brushless Single Speed	Pancake - Brushless Multi-Speed
Type	one-speed and multi-speed resolver and rotary transformer	one-speed, one-pole pair resolver and rotary transformer	multiple pole pairs resolver and rotary transformer
Size diameter	(1/10 in) 30	(1/10 in) 17	(1/10 in) 38 to 63
Speed	1&32	1X	1-64
Accuracy	1&32	1.25 arcmin to 3.50 arcmin	3 arcmin to 30 arcsec (low distortion harmonic)
Transformation ratio	various	various	various
Oper. temp. range	-46 °C to 71 °C [-51 °F to 160 °F]	-46 °C to 71 °C [-51 °F to 160 °F]	-46 °C to 71 °C [-51 °F to 160 °F]
Measurements	various	various	various
Features	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D






Series	Pancake - Brushless Dual-Speed	Pancake - Dual-Speed	Pancake - Multi-Speed	Pancake - Single Speed
Type	one-speed and multi-speed resolver and rotary transformer	one-speed and multiple-speed	multiple pole pairs	one-speed, one-pole pair
Size diameter	(1/10 in) 92	(1/10 in) 31 to 130	(1/10 in) 16 to 67	(1/10 in) 24 to 68
Speed	1&64	1&8, 1&16, 1&32, 1&36, 2&36, 1&64, 1&128	4, 8, 16, 32, 64	1
Accuracy	(multi-speed) 30 arcsec	(multi-speed) 36 arcsec to 4 arcsec	1 arcmin to 5 arcsec	3 arcmin to 30 arcsec
Transformation ratio	various	0.45 ±5 %	0.45 ±5 %	various
Operating temperature range	-46 °C to 71 °C [-51 °F to 160 °F]	-29 °C to 75 °C [-21 °F to 167 °F]	-29 °C to 75 °C [-21 °F to 167 °F]	-29 °C to 75 °C [-21 °F to 167 °F]
Measurements	various	12 in x 10.5 in	26 in	various
Features	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D	non-contact measurement for enhanced reliability; 360° sensing range; multi-speed designs available; variety of excitation voltages and frequencies; environmentally sealed and qualified to RTCA DO-160D

Aerospace & Military Products

Proximity Sensors

Designed to meet demanding temperature, vibration, shock, and EMI/EMP interference specifications. Multiple potential applications are found in aerospace, ordnance, marine, and off-shore equipment.

Series	100 FW	200 FW
Description	one-piece 5/8 in proximity sensor	one-piece 5/8 in proximity sensor
Technology	ECKO	hall
Operating frequency	–	–
Target material	all metals	magnet
Load current	120 mA, 50 mA lamp	100 mA, 50 mA lamp
Supply current	20 mA max. @ 25 °C	20 mA max. @ 25 °C
Sensing face	shielded, unshielded	shielded
Housing material	stainless steel	stainless steel
Guaranteed actuation distance	1 mm to 1,99 mm [0.039 in to 0.0783 in]; 5 mm to 10 mm [0.197 in to 0.394 in]	2 mm to 2,99 mm [0.0787 in to 0.1177 in]
Operating temperature range	-55 °C to 125 °C [-67 °F to 257 °F]	-54 °C to 100 °C [-65.2 °F to 212 °F]
Supply voltage	18 Vdc to 32 Vdc	18 Vdc to 32 Vdc
Output type	normally open, current sinking	normally open/closed, current sinking
BITE	–	–
Short circuit	–	–
Pressure proof	–	–
Reverse polarity	–	–
MTBF (hours)	–	–
Approvals	FM Class 1, Division 2, Groups A, B, C, D	FM Class 1, Division 2, Groups A, B, C, D
Measurements	sensing face: 5/8 in x 63,5 mm L [2.5 in L]	sensing face: 5/8 in x 63,5 mm L [2.5 in L]
Features	all metal sensing; shielded three-wire dc sinking (NPN); high level of electronics protection; lead wire or connector termination	Hall-effect, magnetic field sensitive; high-frequency switching; shielded three-wire dc sinking (NPN); high level of electronics protection

300 FW	21 FW	23 FW	5 FW
two-piece proximity sensor	one-piece 12 mm proximity sensor	one-piece 22,2 mm proximity sensor	target, special, proximity sensor
ECKO	Hall	Hall	magnet
–	2000 Hz	2000 Hz	–
ferrous metals	–	–	–
750 mA	20 mA	20 mA	–
65 mA max.	25 mA	25 mA	–
shielded	stainless steel	stainless steel	stainless steel
stainless steel	stainless steel	stainless steel	stainless steel
1,78 mm to 3,3 mm [0.07 in to 0.130 in]	250 gauss	250 gauss	–
-77 °C to 125 °C [-106.6 °F to 257 °F]	-55 °C to 150 °C [-67 °F to 302 °F]	-55 °C to 125 °C [-67 °F to 257 °F]	-55 °C to 150 °C [-67 °F to 302 °F]
18 Vdc to 32 Vdc	18 Vdc to 32 Vdc	18 Vdc to 32 Vdc	–
normally open/closed, current sinking	normally open, current sinking	normally open, current sinking	–
–	yes	yes	–
–	no	no	–
–	no	no	–
–	no	no	–
–	35000	115000	–
MIL-STD-810B	MIL-STD-461E	MIL-STD-461E	–
Ø 11,2 mm x 31,8 mm L [Ø 0.44 in x 1.25 in L]	Ø 12 mm [Ø 0.47 in]	Ø 22,2 mm [Ø 0.9 in]	Ø 12 mm [Ø 0.47 in]
ferrous metal sensing; two-piece construction; reverse polarity	Hall-effect magnetic field sensitive; single channel; three-wire dc	Hall-effect magnetic field sensitive; triple channel; nine-wire dc	Hall-effect magnetic field sensitive

Aerospace & Military Products

Proximity Sensors, continued

Designed to meet demanding temperature, vibration, shock, and EMI/EMP interference specifications. Multiple potential applications are found in aerospace, ordnance, marine, and off-shore equipment.

Series	922AA2Y-A6P0Z722A	922FS2-A6N-Z735A	ZS-00361
Description	one-piece 15/32 in proximity sensor	one-piece 12 mm proximity sensor	one-piece M12 proximity sensor
Dimension	11,7 mm [0.46 in]	12 mm [0.47 in]	–
Operating frequency	2000 Hz	2000 Hz	80 mA
Load current	250 mA	250 mA	crastin (plastic)
Gd (mm)	3,6	2,8	2,91
Guaranteed actuation distance	2 mm to 2,99 mm [0.0787 in to 0.1177 in]	1 mm to 1,99 mm [0.039 in to 0.0783 in]	1 mm to 1,99 mm [0.039 in to 0.0783 in]
Operating temp. range	-55 °C to 85 °C [-67 °F to 185 °F]	-55 °C to 85 °C [-67 °F to 185 °F]	-25 °C to 85 °C [-13 °F to 185 °F]
Shock	6 g 11 ms ABD 0007	6 g 11 ms ABD 0007	400 g 11 ms
Supply voltage	14 Vdc to 32.5 Vdc	14 Vdc to 32.5 Vdc	14 Vdc to 33 Vdc
BITE	no	no	no
Short circuit	yes	yes	yes
Pressure proof	no	yes	no
Reverse polarity	no	no	yes
Insulation resistance	–	–	50 mOhm @ 500 Vdc
Output type	normally open, current sourcing	normally open, current sourcing	normally open/closed, current sourcing
Measurements	15/32 in 51 mm L [2.01 in]	12 mm 50 mm L [1.97 in]	M12 x 1 72 mm L [2.83 in L]
Features	stainless steel; high frequency switching; high level of electronics protection; lead wire or connector termination	stainless steel; high pressure capability (> 350 bar); high level of electronics protection; lead wire or connector termination	Hall-effect, magnetic field sensitive; stainless steel; high level of electronics protection; high frequency switching

932AB2W	ZS-00351-01	932AA3W	ZS-00240-03B	ZS-00341
one-piece M12 proximity sensor	one-piece M18 proximity sensor	one-piece M18 proximity sensor	one-piece M30 proximity sensor	one-piece underwater proximity sensor
–	–	–	–	–
200 mA	100 mA	≤ 200 mA up to 85 °C to 100 mA at 100 °C	200 mA	≤ 120 mA
ceramic	ceramic	ceramic	stainless steel	stainless steel
6,8	7,27	8,5	ceramic	stainless steel
3 mm to 3,99 mm [0.118 in to 0.157 in]	4 mm to 4,99 mm [0.1574 in to 0.19646 in]	4 mm to 4,99 mm [0.1574 in to 0.19646 in]	5 mm to 10 mm [0.197 in to 0.394 in]	ZS-00341-01: ≥ 0.8 mm; ZS-00341-02: ≥ 21.84 mm
-40 °C to 100 °C [-40 °F to 212 °F]	-35 °C to 63 °C [-31 °F to 145 °F]	-40 °C to 100 °C [-40 °F to 212 °F]	-55 °C to 85 °C [-67 °F to 185 °F]	-55 °C to 90 °C [-67 °F to 194 °F]
100 g 6 ms	500 g 0.5 ms	100 g 6 ms	100 g 6 ms	6 g 11 ms
20 Vdc to 33 Vdc	12 Vdc to 32 Vdc	20 Vdc to 323 Vdc	14 Vdc to 33 Vdc	14 Vdc to 32.5 Vdc
no	yes	no	no	no
yes	yes	yes	yes	yes
no	no	no	no	yes
yes	yes	yes	yes	yes
> 50 mOhm @ 500 Vdc	10 mOhm @ 500 Vdc	> 50 mOhm @ 500 Vdc	–	–
normally open, current sourcing	normally open, current sinking	normally open, current sourcing	normally open/closed, current sourcing	normally open, current sourcing
M12 x 1 77 mm L [3.03 in L]	M18 x 1 73 mm L [2.87 in L]	M18 x 1 80 mm L [3.15 in L]	M30 x 1,5 55 mm L [2.17 in L]	Ø 23 mm x 64 mm L [Ø 0.91 in x 2.52 in L]
stainless steel; high level of electronics protection; high frequency switching; lead wire or connector termination	stainless steel; high level of electronics protection; built-in test function (BITE); lead wire or connector termination	Hall-effect, magnetic field sensitive; stainless steel; high level of electronics protection; high frequency switching	Hall-effect, magnetic field sensitive; stainless steel; high level of electronics protection; high frequency switching	ferrous metal sensing; high level sealing by overmolding; enhanced performance sealed and shielded cable

Aerospace & Military Products
Precision Thermostats

Hermetic/non-hermetic devices available. High reliability versions meet stringent requirements of military and aerospace industries for dielectric strength, moisture, resistance, vibration, and shock. Often used in environmental and flight controls, aerospace engines, flight decks, cargo holds, landing gear, and space craft.

Series	3000 Custom Packaged	3100 Hermetic
Description	custom packaged	hermetic
Amperage	dependent on the internal device	2.0 A/1.0 A/5.0 A
Housing material	stainless steel or brass	steel housing hermetically sealed with glass-to-metal seal at terminal junction
Operating temperature range	-29 °C to 260 °C [-20 °F to 500 °F]	-29 °C to 260 °C [-20 °F to 500 °F]
Environmental exposure range	-62 °C to 288 °C [-80 °F to 550 °F]	-62 °C to 288 °C [-80 °F to 550 °F]
Dielectric strength	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case
Insulation resistance	MIL-STD-202, Method 302; 50 MOhm min. terminal to case	MIL-STD-202, Method 302; Cond. B - 50 MOhm - 500 Vdc applied
Contact resistance	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm
Hermetic seal	MIL-STD-202, Method 112; Cond. A, 1 x 10^{-5} atm cc/s	MIL-STD-202, Method 112; Cond. 1 x 10^{-5} atm cc/s
Moisture resistance	MIL-STD-202, Method 106	MIL-STD-202, Method 106
Shock	–	–
Vibration	–	–
Thermal shock	–	–
Salt spray	–	–
Acceleration	–	–
Approvals	–	–
Features	custom packaging; hermetically sealed; tight tolerances and differentials; hermetic connector or potted construction	hermetically sealed; tight tolerances and differentials; pre-set and tamper proof; SPST contacts

3MS1 Series	35XX Series	3200 Aerospace
QPL series military thermostats	military thermostat	aerospace
5.0 A resistive	5.0 A resistive	5.0 A resistive
steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction	steel housing hermetically sealed with glass-to-metal seal at terminal junction
-46 °C to 191 °C [-50 °F to 375 °F]	-46 °C to 204 °C [-50 °F to 400 °F]	-51 °C to 163 °C [-60 °F to 325 °F]
-65 °C to 260 °C [-85 °F to 500 °F]	-65 °C to 260 °C [-85 °F to 500 °F]	-65 °C to 177 °C [-85 °F to 350 °F]
MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - Terminal to Case	MIL-STD-202, Method 301; 1250 Vac
MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm
MIL-STD-202, Method 307; 0.050 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm max.	MIL-STD-202, Method 307; 0.025 Ohm max.
MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. C	MIL-STD-202, Method 112; Cond. C
MIL-STD-202, Method 106	MIL-STD-202, Method 106	MIL-STD-202, Method 106
MIL-STD-202, Method 213; 100 G	MIL-STD-202, Method 213; 400 G	MIL-STD-202, Method 213; 750 G
MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 30 G; MIL-STD-202, Method 214; 50 G
MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B
MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B
MIL-STD-202, Method 212; 20 G	MIL-STD-202, Method 212; 20 G	MIL-STD-202, Method 212; 20 G
MIL-PRF-24236/1 and QPL	meets or exceeds requirements of MIL-PRF-24236	MIL-S-24236/NASA S-311-641/01
hermetically sealed; tight tolerances and differentials; hi-rel; QPL listed	hermetically sealed; tight tolerances and differentials; hi-rel	NASA certified; space qualified; hermetically sealed; tight tolerances and differentials; pre-set and tamper proof; SPST contacts

Aerospace & Military Products
Packaged Temperature Probes

Compact, lightweight. Operate with enhanced sensitivity, reliability, and stability under diverse conditions of shock, vibration, humidity, and corrosion. Variety of custom packages available for air, liquid, and solid temperature sensing applications. Often used for engine bleed air, operator controls, environmental control systems, and weather stations.

Series	R300	ES-110
Temp. sensing type	immersion	air/gas
Thermistor type	RTD	NTC
Nominal resistance at 25 °C [77 °F]	100 Ohm	2000 Ohm
Operating temperature range	-40 °C to 275 °C [-40 °F to 572 °F] continuous, excursion to 300 °C [572 °F] for 10 minutes max.	-40 °C to 150 °C [-40 °F to 302 °F]
Housing material	stainless steel	brass
Electrical and mechanical interface	overmolded connector with M14 x 1.50 thread	overmolded connector with M10 x 1.25 or M12 x 1.50 thread
Features	enhanced response, reliability, and accuracy; stainless steel construction	exposed thermistor; rugged design; brass encapsulation





ES-120	512	526	534	590
immersion	surface	surface	surface	surface
NTC or KTY	NTC	NTC	NTC	NTC
2000 Ohm	200,000 Ohm	2000 Ohm	various	10,000 Ohm
-40 °C to 150 °C [-40 °F to 302 °F]	-60 °C to 204 °C [-76 °F to 399 °F]	-60 °C to 160 °C [-76 °F to 320 °F]	-30 °C to 50 °C [-22 °F to 122 °C]	-60 °C to 125 °C [-76 °F to 257 °F]
brass	aluminum	aluminum or stainless steel	various	aluminum or stainless steel
overmolded connector with M10 x 1.25, M10 x 1.0, M12 x 1.5, M14 x 1.50 thread, or 1/8 PTF	ring tongue #5 with two flying leads	adhesion with two flying leads; bullet housing with two flying leads	three tinned copper alloy leads; network configuration: two thermistors in a thermoplastic housing with two flying leads	adhesion with two flying leads; ring tongue (#5, #6, #10) with two flying leads; ring tongue with Molex connector; threaded body with flying leads
enclosed thermistor; rugged design; brass encapsulation	wide variety of probe assembly styles; choice of custom or existing designs; enhanced sensitivity, accuracy, stability/low drift; RTD linear output available	wide variety of probe assembly styles; choice of custom or existing designs; enhanced sensitivity, accuracy, stability/low drift; RTD linear output available	simplifies circuitry in digital readout systems; delivers relatively linear resistance output and offers the enhanced sensitivity and accuracy of a thermistor; can be used in a resistance or voltage mode	wide variety of probe assembly styles; choice of custom or existing designs; enhanced sensitivity, accuracy, stability/low drift; RTD linear output available

Aerospace & Military Products
Variable Reluctance Speed Sensors

Simple, rugged devices that do not require an external voltage source for operation, Variable Reluctance sensors provide direct conversion of actuator speed to output frequency. Potential applications include engine and motor RPM, process, flow, wheel-slip, and gear-speed measurement.

Variable Reluctance Speed Sensors	VRS General Purpose	VRS Hazardous Location
Output voltage range	8 Vp-p to 40 Vp-p (inclusive)	30 Vp-p to 60 Vp-p (inclusive)
Housing diameter	5/8 in, 3/8 in, 1/4 in, 10/32 in	3/4 in, 5/8 in
Housing material/style	stainless steel threaded or smooth	stainless steel threaded
Termination	MS3106 connector, preleaded	MS3106 connector, preleaded
Operating temperature range	-55 °C to 120 °C [-67 °F to 250 °F] (inclusive)	-73 °C to 120 °C [-100 °F to 250 °F] (inclusive)
Coil resistance	45 Ohm to 85 Ohm	191 Ohm to 280 Ohm
Inductance	25 mH max.	115 mH max.
Gear pitch range	24 DP (module 1.06) or coarser	12 DP (module 2.11) or coarser
Optimum actuator	20 DP (module 1.27) ferrous metal gear	8 DP (module 3.17) ferrous metal gear
Min. surface speed	0,50 ms [20 in/s] typ.	0,38 ms [15 in/s] typ.
Max. operating freq.	50 kHz typ.	40 kHz typ.
Vibration	MIL-STD-202F, Method 204D	MIL-STD-202F, Method 204D
Features	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available

VRS High Output	VRS High Resolution	VRS High Temperature	VRS Power Output
8 Vp-p to 190 Vp-p (inclusive)	17 Vp-p to 170 Vp-p	4.7 Vp-p to 125 Vp-p (inclusive)	70 Vp-p (inclusive)
5/8 in, 3/8 in	5/8 in, 3/8 in	5/8 in, 3/8 in, 1/4 in	5/8 in
stainless steel threaded or smooth	stainless steel threaded	stainless steel threaded	stainless steel threaded
MS3106 connector, preleaded	MS3106 connector, preleaded	MS3106 connector, preleaded	MS3106 connector, preleaded
-55 °C to 150 °C [-67 °F to 300 °F] (inclusive)	-55 °C to 120 °C [-67 °F to 250 °F]	-73 °C to 230 °C [-100 °F to 450 °F] (inclusive)	-55 °C to 120 °C [-67 °F to 250 °F]
910 Ohm to 1200 Ohm	45 Ohm to 85 Ohm	65 Ohm typ.	120 Ohm to 162 Ohm
450 mH max.	25 mH max.	30 mH max.	85 mH max.
24 DP (module 1.06) or coarser	36 DP (module 0.07) or coarser	24 DP (module 1.06) or coarser	12 DP (module 2.11) or coarser
20 DP (module 1.27) ferrous metal gear	n/a	20 DP (module 1.27) ferrous metal gear	8 DP (module 3.17) ferrous metal gear
0,25 ms [10 in/s] typ.	0,50 ms [20 in/s] typ.	0,50 ms [20 in/s] typ.	0,38 ms [15 in/s] typ.
15 kHz typ.	50 kHz typ.	50 kHz typ.	40 kHz typ.
MIL-STD-202F, Method 204D	MIL-STD-202F, Method 204D	n/a	MIL-STD-202F, Method 204D
self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available

Aerospace & Military Products
Speed Sensors

Speed sensors use a magnetically biased Hall-effect IC (integrated circuit) to accurately sense movement of ferrous metal targets. The specially designed IC and a permanent magnet are sealed in rugged, probe-type packages. Often used in military vehicle wheels/suspension, RPM, speedometer/MPH sensing, and in hydraulic pumps.

Series	1GT	GTN
Description	single Hall-effect sensor	single Hall-effect sensor
Housing	plastic probe	plastic probe
Supply voltage range	4.5 Vdc to 26.5 Vdc (inclusive)	8 Vdc to 32 Vdc (inclusive)
Supply current	20 mA	40 mA
Output type	digital sinking (open collector)	digital sinking (open collector)
Operating frequency range	0 Hz to 25 kHz (inclusive)	2 Hz to 9 kHz
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]
Measurements	Ø 17,9 mm x 31,8 mm L [Ø 0.70 in x 1.25 in L]	Ø 20 mm x probe length (varies) [Ø 0.77 in x probe length (varies)]
Features	fast operating speed; reverse polarity and transient protection; EMI resistant	choice of barrel lengths; integrated electronic diagnostics; enhanced operating speed

LCZ	SNDH-H	SNDJ
single Hall-effect zero speed sensor	Hall-effect speed sensor	zero speed Hall-effect sensor, differential Hall-effect sensor, dual Hall-effect sensor
stainless steel	stainless steel, plastic	stainless steel
4.5 Vdc to 26 Vdc	4 Vdc to 24 Vdc, 4.5 Vdc to 24 Vdc, 6.5 Vdc to 24 Vdc	8 Vdc to 32 Vdc (inclusive)
20 mA	6 mA max., 14 mA max., 20 mA max.	10 mA to 20 mA max. (inclusive)
digital sinking	digital sinking	square wave and one direction signal; square wave signal from NPN output transistor with 2.7 kOhm pull-up; dc-coupled to supply; square wave signal from push-pull stage; dc-coupled to supply
0 Hz to 15 kHz	0 Hz to 12 kHz, 0 Hz to 15 kHz, 2 Hz to 15 kHz	0 Hz to 15 kHz (inclusive)
-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 150 °C [-40 °F to 302 °F] inclusive	-20 °C to 100 °C [-4 °F to 212 °F]
9,5 mm [3/8 in/0.375 in] and 15,9 mm [5/8 in/0.625 in] diameters; 50,8 mm [2.00 in] and 76,2 mm [3.00 in] lengths	various, depends upon type	Ø 12 mm x 58,7 mm L [Ø 0.47 in x 2.31 in L]
omni-directional sensor to target; low power consumption; zero speed; digital output	rotationally insensitive versions available; zero speed sensing versions available; range of connector options	backbiased Hall-effect; direct sensing of ferrous metal target; zero speed sensing; rotational orientation independent of sensor

Aerospace & Military Products
Precision Potentiometers

Compact and rugged thick-film devices are available in a wide range of resistance values. These devices use precision technology developed for military applications. Often used in missile fin, track vehicle transmission height, and FLIR mirror position.

Series	MKV
Type	conductive plastic element
Expected rotational life	10 million cycles
Element type	conductive plastic
Power rating	1 W
Terminal type	turret
Resistance range	500 Ohm to 20 kOhm
Bushing type	no bushing, standard
Potentiometer type	precision
Electrical taper	linear
Measurements	body: Ø 22,23 mm [Ø 0.875 in]; bushing: 6,35 mm [0.25 in] x 32 NEF-2A
Features	linearity 0.5 % or less; Servo and bushing mounting; custom electrical travels

Aerospace & Military Products
Pressure Sensors and Switches

Known for enhanced quality, reliability, and durability. Engineered with fully steel media isolating with stainless steel and no internal elastomeric seals. Resistant to harsh, aggressive media, and challenging environments. Potential applications include aerospace (environmental systems, engines, fuel pressure, and hydraulic systems), military ground vehicles, ordnance and munitions release systems, and military maritime systems.

Series	MLH	1HP
Pressure connection	1/4-18 NPT; M12 x 1.5 (ISO 6149); M14 x 1.5 (ISO 6149); 3/8-24 UNF (SAE-3 o-ring boss); M18 x 1.5 (ISO 6149); 1/8 in-27 NPT; 1/2 in-20 UNF (SAE-5 o-ring boss); M10 x 1 (ISO 6149); 1/4 in SAE female Schrader; 7/16-20 UNF (SAE-4 o-ring boss); 1/2 in NPT; 9/16-18 UNF (SAE-6 o-ring boss); PT 1/4-19 BSP tapered thread; G 1/4-19 (DIN 3852-2); G 1/8 with o-ring groove; M16 x 1.5 (ISO 6149); G 1/4 with o-ring groove; G 1/8 (DIN 3852-2); PT1/8-28 BSP tapered thread; M20 x 1.5 (ISO 6149); 1/2-20 37° Flare (SAE JIC)	MS33656E4 MS33514E4 MS33656E3 AS5202-04
Measurement	gage, sealed gage	gage, sealed gage
Construction	port - 304L stainless steel; diaphragm - Haynes 214 alloy	stainless steel
Pressure range	0 psi to 50 psi through 0 psi to 8000 psi	150 psi to 5000 psi
Output signal	0.5 Vdc to 4.5 Vdc ratiometric output at 5 Vdc excitation; 4 mA to 20 mA current from 9.5 Vdc to 30 Vdc excitation; 1.0 Vdc to 6.0 Vdc regulated output from 8 Vdc to 30 Vdc excitation; 0.25 Vdc to 10.25 Vdc regulated output from 14 Vdc to 30 Vdc excitation; 0.5 Vdc to 4.5 Vdc regulated output from 7 Vdc to 30 Vdc excitation; 0 mV to 50 mV from 5 Vdc excitation; 1 Vdc to 5 Vdc output from 8 Vdc to 30 Vdc excitation	28 Vdc excitation
Accuracy	±0.25 % full scale BFSL (±0.5 % full scale BFSL on ranges below 100 psi)	set point precision: ±10 %
Amplified	yes	no
Temp. range	-40 °C to 125 °C [-40 °F to 257 °F] (comp.)	-55 °C to 70 °C [-67 °F to 158 °F]
Termination	Packard MetriPak 150; Hirschmann; M12 x 1 (Brad Harrison micro); DIN 72585 (Cannon APD type); DIN 43650-C (IP65); Amp Superseal 1.5 (IP67); cable; flying leads; Deutsch DTM04-3P (integral)	back exit, M22759/7-20 wire; right angle exit, M27759-7-20 wire MS3106A-10SL-3S connector
Measurements	27,0 mm H x 27,0 mm W x 55 mm D [1.06 in H x 1.06 in W x 2.18 in D]	Ø 21 mm x 70 mm L [Ø 0.825 in x 2.77 in L]
Approvals	UL, CE (for many models)	qualified to RTCA DO-160D; MIL-PFR-8805 rated switch mechanism
Features	all-wetted parts; no internal elastomeric seals; stable and creep-free; reverse voltage and output short circuit protected; less than 2 ms response time	suitable for air, fuel, water, oil, or Skydrol™; easily configurable to different pressure set points and differentials; burst pressure rating of 12000 psi; high current or logic-level loads; configurable with multiple pressure fittings and electrical connectors

Honeywell Sensing and Control is a global leader in providing reliable, cost-effective sensing and switching solutions for our customers' applications. We serve thousands of customers in four core industry segments: industrial, medical equipment, transportation, and aerospace/military products.

Aerospace

Aerospace applications are among the most demanding for any type of product. Rigorous FAA requirements, extreme environments (temperature, shock, vibration, the need for hermetic sealing), and the ability to customize devices are just a few of the parameters often required of sensors and switches in these applications. Aerospace customers typically value speed in prototyping and development, and Honeywell's vertically integrated, AS9100-approved manufacturing locations enhance our ability to produce devices in a wide variety of packages. The precision output of our products helps reduce risk and cost in key applications while also minimizing the need for unscheduled maintenance.

Honeywell's in-depth aerospace engineering experience allows us to work with customers in the design and development of products that best meet the specified requirements of their individual applications. Making products simple to install makes the job easier every step of the way. And, the odds are that Honeywell is already on the list of trusted suppliers for many aerospace companies, underscoring the decades of experience we bring to this field.

Honeywell products for this industry (many of them PMA-certified) include force sensors, load cells, potentiometers, pilot controls, pressure sensors, pressure switches, resolvers, sensor/actuator assemblies for systems ranging from aerostructures to fuel control to flight surfaces, speed sensors, temperature probes, thermostats, torque sensors, y-guides for cargo systems, MICRO SWITCH™ sealed and high-accuracy switches, MICRO SWITCH™ pushbutton switches, and MICRO SWITCH™ rocker and toggle switches.

Medical

Medical applications typically require sensors and switches that are highly stable and extremely reliable to enhance patient safety and comfort. Stability is often essential to minimize long term drift, reduce the need for recalibration, and improve ease of use for medical equipment operators. Reliability enhances patient safety in life-critical applications, reduces downtime, and improves test throughput in applications such as clinical diagnostics. The product needs to be easy to use and easy to design into a system, so Honeywell's extensive customization and built-in calibration/amplification capabilities are strong benefits. Confidence in Honeywell's product performance, reliability, and availability provide peace of mind for medical equipment manufacturers who choose Honeywell.

Honeywell offerings for this industry include airflow sensors, silicon and stainless steel media isolated pressure sensors, Hall-effect magnetic position sensor ICs, humidity sensors, flexible heaters, force sensors, thermostats, commercial solid state sensors, infrared sensors, oxygen sensors, pressure and vacuum switches, potentiometers and encoders, MICRO SWITCH™ pushbutton, rocker, and toggle switches, and hour meters.

Industrial

The industrial arena can be a rough one. From high-speed food processing to high-force stamping applications, reliable and cost-effective sensors and switches often help minimize repair costs, maximize system life, and reduce overall system expense. Durability can mean the difference between smooth-running processes and expensive downtime. Accurate, repeatable sensor or switch output can reduce the need for calibration once the device is applied. Because of the wide variety of potential applications, Honeywell's ability to deliver a customized product that can meet virtually any size, weight, and power requirement – as well as any packaging stipulations for tough, harsh environments – often makes it easy to incorporate and use our devices. Safety is another important consideration for industrial users, and our products meet a wide variety of regulatory safety requirements.

Honeywell's industrial product line includes airflow sensors, current sensors, humidity sensors, fiber-optic and liquid-level sensors, linear position sensors, oxygen sensors, pressure sensors, potentiometers and encoders, speed sensors, temperature probes, ultrasonic sensors, wirewound resistors, thermostats, commercial solid state sensors, flex heaters, SMART position sensors, silicon and stainless steel media isolated pressure sensors, force sensors, safety light curtains, push-pull switches, and MICRO SWITCH™ snap-action switches, hazardous area switches, safety switches, key and rotary switches, limit switches, sealed and high-accuracy switches, pushbutton, rocker, toggle switches, and relays.

Transportation

Getting from point A to point B is often challenging for transportation providers. Honeywell aims to make the trip easier with highly reliable, cost-effective switches and sensors. Our products are designed to support rigorous engine requirements, and their efficiency can also help optimize engine performance. Customization is often required to allow a switch or sensor to be mounted in tight or challenging environments such as vibration, temperature extremes, and road contamination. The durability of Honeywell products enhances system reliability, which is also boosted by the stable, accurate output of our devices. All of these capabilities allow demanding customers to rely on Honeywell's many years of experience in the transportation industry.

Honeywell products for transportation applications include Hall-effect rotary position sensors, infrared sensors, keyless entry sensors, magnetic position sensors, pressure sensors, speed and direction sensors, ultrasonic sensors, thermostats, temperature probes, commercial solid state sensors, SMART position sensors, and MICRO SWITCH™ pushbutton, rocker, and toggle switches.

Sensing and Control Product Portfolio

Product reliability. Industry knowledge. Expertise. Standard with every order.

With more than 50,000 sensing, switching, and control products ranging from snap-action, limit, toggle, and pressure switches to position, speed, pressure, and airflow sensors, Honeywell Sensing and Control has one of the broadest sensing and switching portfolios available.

SENSORS

Airflow sensors: Advanced microstructure technology. Sensitive and fast response to flow, amount/direction of air or other gas. Proportional output voltage. Thin-film, thermally isolated bridge structure consists of a heater and temperature sensing elements. **May be used in:** HVAC, respirators, process control, oxygen concentrators, gas metering, chromatography, leak detection equipment, medical/ analytical instrumentation, and ventilation equipment.

Current sensors: Accurate and fast response. Almost no thermal drift or offset with temperature. Adjustable linear, null balance, digital, and linear current sensors. **May be used in:** Variable speed drives, overcurrent protection, power supplies, ground fault detectors, robotics, industrial process control, and wattmeters.

Flexible heaters: Flat, molded-to-shape, spiral wrap, transparent, composite, and high temperature configurations with single, multiple, and variable watt densities. Can be bonded parts or combined. **May be used in:** Airborne valves, outdoor cameras, LCD displays, scanners, and telecommunication.

Force sensors: Variety of package styles and various electrical interconnects including pre-wired connectors, printed circuit board mounting, and surface mounting for flexibility. **May be used in:** Infusion and syringe pumps, blood pressure equipment, pump pressure, drug delivery systems, occlusion detection, and kidney dialysis machines.

Humidity sensors: Configured with integrated circuitry. Provide on-chip signal conditioning with interchangeability of ±3 % accuracy and out-of-the-box reliability. Standardized, platform-based sensors. **May be used in:** Air compressors, food and beverage packaging and processing, HVAC, printing presses, and office equipment.

Infrared sensors: IREDs, sensors, and assemblies for object presence, limit and motion sensing, position encoding, and movement encoding. Variety of package styles, materials, and terminations. **May be used in:** Printers/copiers, motion control systems, metering, data storage systems, scanning, automated transaction, drop sensors, and non-invasive medical equipment.

Magnetic sensors: Digital and analog Hall-effect position ICs, magnetoresistive position ICs, Hall-effect vane, gear-tooth, and magnetic sensors. **May be used in:** Speed and RPM sensing, motor/fan control, magnetic encoding, disc speed, tape, flow-rate sensing, conveyors, ignitions, motion control/detection, power/position, magnetic code reading, vibration, and weight sensing.

Position sensors: The **SMART position sensor** linear configuration is one of the most durable, adaptable and lightweight linear position devices available in the industry today. Its simple, non-contact design eliminates mechanical failure mechanisms, reduces wear and tear, improves reliability and durability, enhances operation efficiency and safety, and minimizes downtime. **May be used in**: valve position, material handling, plastic molding, cutting/slitting, wafer handling, CNC machines, passenger bus level position, truck-mounted crane outrigger position, heavy equipment attachment identification, hydraulic cylinders, marine motors, syringe pumps, and aircraft actuators. **Potentiometer sensors** measure linear, rotary position or displacement. Honeywell's proprietary conductive plastic delivers extensive temperature range and infinite resolution, and provides precision position measurement. **May be used in**: robotic motion control, marine steering, and in-tank level sensing. **Ultrasonic sensors** measure time delays between emitted and echo pulses, often accurately determining the sensor-to-target distance. These non-contact-based products solve the toughest sensing problems by detecting targets made of virtually any material, regardless of color, transparency, shine or opacity. **May be used in**: level measurement, height and thickness sensing, and diameter control.

Pressure sensors - silicon: Full line of industrial-grade sensors: media-isolating design, multiple ports and outlets, and electrical configurations. **May be used in:** Pneumatic controls, air compressors, process monitoring, hydraulic controls, VAV controls, clogged filter detection, presence/absence of flow, transmissions, and refrigeration.

Pressure sensors - stainless steel media isolated: Bonded strain gage technology. Very resistant to effects of shock, vibration, and hostile environments. **May be used in:** HVAC, hydraulic controls, suspensions, agricultural equipment, engines, compressors, robotics, industrial and automotive systems, pressure transmitters, process controls, and medical diagnostics.

Proximity sensors: Designed to meet demanding temperature, vibration, shock, and EMI/EMP interference requirements. Number of housing materials and termination styles. **May be used in:** Aircraft landing gear, gun turret position control, and door and hatch open/ closed monitoring.

Rotary position sensors: Digital and analog Hall-effect, magnetoresistive, and potentiometric devices for sensing presence of a magnetic field or rotary position. Directly compatible with other electronic circuits for application flexibility. **May be used in:** Audio and lighting, frequency, temperature, position, time, medical/instrumentation, computer peripherals, manual controls, joysticks, telecommunication, welding, heating, and aerospace.

Speed sensors: Measure speed, position, and presence detection utilizing magnetoresistive, variable reluctance, Hall-effect, variable inductance, and Spiral technologies. **May be used in:** Cam and crankshafts, transmissions, fans, pumps, mixers, rollers, compressors, industrial process control, engines/motors, wheels, and tachometers.

Temperature sensors: Customized probes, thermistors, and RTD sensors. Plastic/ceramic, miniaturized, surface-mount housings, and printed circuit board terminations. **May be used in:** Semi-conductor protection, vending machines, power generation, hydraulic systems, thermal management, and temperature compensation.

Thermostats: Commercial and precision snap-action. Automatic or manual reset options, phenolic or ceramic housings. **May be used in:** Telecommunications, battery heater controls, computers, copy machines, fax machines, food service, food carts, small and major appliances, heat and smoke detectors, and HVAC equipment.

ELECTROMECHANICAL SWITCHES

MICRO SWITCH™ snap-action series: Snap-action precision switches. Compact. Lightweight. Designed for repeatability and enhanced life. Premium and standard snap-action switches: standard, miniature, subminiature, hermetically sealed, and high-temperature versions. **May be used in:** Vending machines, communication equipment, HVAC, appliances, electronic gaming machinery, valve controls, irrigation systems, foot switches, pressure, and temperature controls.

MICRO SWITCH™ hazardous area switches: Flame path designed to contain and cool escaping hot gases that could cause an explosion. MICRO SWITCH™ EX, BX, CX, and LSX Series. **May be used in:** Grain elevators and conveyors, off-shore drilling, petrochemical, waste-treatment plants, control valves, paint booths, and hazardous waste handling facilities.

Key and rotary switches: Used on machinery in harsh environments. O-rings help keep dirt and moisture out and prolong life. **May be used in:** All-terrain vehicles, golf carts, snowmobiles, scissor lifts, telehandlers, construction and marine equipment, skid loaders, agricultural equipment, material handlers.

MICRO SWITCH ™ limit switches: Broadest and deepest limit switch portfolio. Rugged, dependable position detection solutions. MICRO SWITCH™ heavy-duty limit switches (HDLS) and global limit switches. Hermetically and environmentally sealed switches. **May be used in:** Machine tools, woodworking, textile, and printing machinery, metal fabrication, balers/compactors, forklifts, bridges, robotics, wind turbines, elevators, moving stairs, doors, dock locks/levelers, aerial lifts, cranes, conveyors, rail, shipboards, and dock side.

MICRO SWITCH™ sealed and high accuracy switches: Precision 'snap action' mechanisms. Wide variety of actuators, terminations, circuitry configurations, electrical ratings, contact materials, and operating characteristics. **May be used in:** Landing gear, flap/stabilizer controls, thrust reversers, space vehicles, armored personnel carriers, de-icer controls, wingfold actuators, industrial environments, valves, and underwater.

MICRO SWITCH™ pushbutton switches: Lighted or unlighted. Wide range of electrical and display design, pushbuttons, and manual switches. Many shapes, sizes, and configurations. Easy to apply, operate, and maintain. **May be used in:** Control boards and panels, industrial and test equipment, computers, medical instrumentation, and aerospace.

MICRO SWITCH™ rocker switches: Wide range of electrical and display design. Many shapes, sizes, and configurations to enhance manual operation. **May be used in:** Transportation, agricultural and construction equipment, test equipment, heavy-duty machinery, marine equipment, small appliances, telecom, medical instrumentation, and commercial aviation.

MICRO SWITCH™ toggle switches: Wide range of electrical and display design. Available in many shapes, sizes, and configurations. **May be used in:** Aerial lifts, construction equipment, agriculture and material-handling equipment, factory-floor controls, process control, medical instrumentation, test instruments, and military/commercial aviation.

MICRO SWITCH™ aerospace-grade pressure switches: lightweight, compact pressure switches sense changes in gas/pressure. Qualified to MIL-PFR-8805. Lower operating force provides application versatility with enhanced precision. Design modularity allows for configuration of the switch, facilitating rapid customization to the precise, demanding requirements. **May be used in**: aerospace systems -including engines, fuel pressure, and hydraulic systems, military ground vehicles, ordnance and munitions release systems, military maritime systems.

Pressure and vacuum switches: Feature set points from 0.5 psi to 3000 psi. Rugged components have enhanced repeatability, flexibility, and wide media capability. **May be used in:** Transmissions, hydraulics, brakes, steering, generators/compressors, dental air, embalming equipment, oxygen concentrators, air cleaners, fuel filters, and pool water pressure.

WIRELESS SWITCHES

Limitless™ Series: Combines the best of MICRO SWITCH™ limit switches with latest commercial wireless technology. Beneficial for remote monitoring where wiring/maintenance is not physically possible or economically feasible. Used for position sensing and presence/absence detection. **May be used in:** valve position, crane boom/jib/skew position, lifts, material handling, presses, construction/ag machines, conveyors, remote/temporary equipment, grain diverters or flaps, and door position.

SAFETY PRODUCTS

MICRO SWITCH™ safety switches: For operator point-of-operation protection, access detection, presence sensing, gate monitoring, and electrical interfacing. High-quality, dependable, cost-effective solutions. **May be used in:** Packaging and semi-conductor equipment, plastic-molding machinery, machine tools, textile machines, lifts, industrial doors, bailers, compactors, aircraft bridges, telescopic handlers, refuse vehicles.

Safety light curtains: Different resolutions permit detection of an approaching finger, hand, limb, or body. Separate or self-contained control units, various housing sizes, resolutions, scanning ranges, and protection heights. **May be used in:** Point-of-operation protection, access detection, presence sensing, gate monitoring, electrical-to-machine-circuitry interfacing, emergency stop circuits on machines, sliding door protection, conveyors, and transfer lines.

Warranty/Remedy

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 other 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.

⚠ WARNING

MISUSE OF DOCUMENTATION

- The information presented in this literature is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

For products not designed for safety applications:

⚠ WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

For products designed for safety applications:

⚠ WARNING

RISK TO LIFE OR PROPERTY

Never use this product for an application involving serious risk to life or property without ensuring that the system as a whole has been designed to address the risks, and that this product is properly rated and installed for the intended use within the overall system.

Failure to comply with these instructions could result in death or serious injury.

Find out more

To learn more about Honeywell's sensing and control products, call **+1-815-235-6847**, email inquiries to **info.sc@honeywell.com**, or visit **www.honeywell.com/sensing**

To learn more about Honeywell's sensing and control products, call **+1-614-850-5000**, email inquiries to **info.tm@honeywell.com**, or visit **www.honeywell.com/sensotec**

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