

# **AEROSPACE** **& DEFENSE**

Sensors and Switches Product Range Guide



**Honeywell**



# HONEYWELL IS BUILT ON ENGINEERING

We can tailor **CUSTOM SOLUTIONS**



**IN-DEPTH AEROSPACE EXPERIENCE** allows us to work with customers in the design and development of products to meet specified requirements



We offer **COMPONENT DESIGN EXPERTISE** and products for the most complex systems



Honeywell can deliver **ELECTRICAL & MECHANICAL DESIGNS QUICKLY**, for build-to-print, new, re-design and testing purposes



With multiple technology offerings, **HONEYWELL IS AN INNOVATION AND DESIGN PARTNER**



As a **VERTICALLY INTEGRATED PARTNER** and AS9100D approved manufacturer, Honeywell has strategic engineering and manufacturing centers world wide



We maintain relevant approvals: **ISO, AS, QS, FAA, JAA** and more along with certifications **MIL-STD-810, DO-160, MIL-PRF-8805**



**Honeywell is a world-leading manufacturer of systems and components for the Aerospace industry. Our Sensing & Safety Technologies business is a leading supplier of innovative advanced sensory & switching solutions, including:**

- Environmentally and hermetically sealed basic switches
- Toggles switches and other custom operator controls
- Speed and position sensing technologies
- Pressure and temperature transducers

Honeywell Sensing and Safety Technologies (SST) products are used on a broad range of actuation and control systems across various platforms in operation today. Our install base spans into sectors such as commercial aviation, defense and military, marine and space, which we have been serving for decades with our robust products and technological solutions. Additionally, our engineering teams have extensive years of experience and industry-wide expertise in areas such as design, compliance, quality, manufacturing and production.

**Over six decades of experience, designing technologically advanced solutions and serving customers in the aerospace industry.**

# AFTERMARKET PRODUCTS AND SERVICES

Honeywell is a trusted supplier of precision aerospace assemblies and provides EASA and FAA-Certified repair services.

Our position sensors, sealed, basic, limit, and thermostatic switches are found on a wide range of commercial and military aircraft and carry Parts Manufacturer Approval (PMA) and Mil-Spec qualification.

## PRECISION AEROSPACE ASSEMBLIES AND REPAIR/OVERHAUL SERVICES

Honeywell offers approved aftermarket spare parts and FAA-certified repair services. All aerospace assembly products listed in our documentation are PMA-approved for operator use as spares and are fully repairable and serviceable.

Our repair facility is staffed by highly experienced technicians and is co-located at the site where the parts are designed and built. The Honeywell repair facility is a FAA-Certified 14 CFR Part 145 repair site; Class 2 & 4 instrument-rated repair certified, Class 1, 2 & 3 accessory-rated repair certified, and EASA Certified. View our aerospace repair station certificates: <http://sensing.honeywell.com/quality-certs>

## OPERATOR CONTROL, SEALED SWITCH, BASIC & LIMIT SWITCH, AND THERMAL COMPONENTS

Honeywell offers FAA-PMA approved aftermarket spare parts. Visit our web site for further details.



# CUSTOM SENSOR & SWITCH SOLUTIONS

**Honeywell combines our electromechanical switches and range of sensing solutions with ruggedized, application-specific packaging to address unique needs and environmental challenges, with many assemblies fully qualified to DO-160 or MIL-standard environmental test requirements.**

Applications on-board aircraft today are broad, ranging from power door operating systems to landing gear and gunport doors – in all of these applications, extreme reliability, product integrity, and redundancy are critical.

Our engineering teams work with customers to design dedicated packaged solutions based on their application needs, combining all necessary features into one interchangeable, pre-calibrated assembly. This can help to save time, weight, and wiring, compared to using independent switches and brackets, as well as improve environmental resilience.

Summary offering:

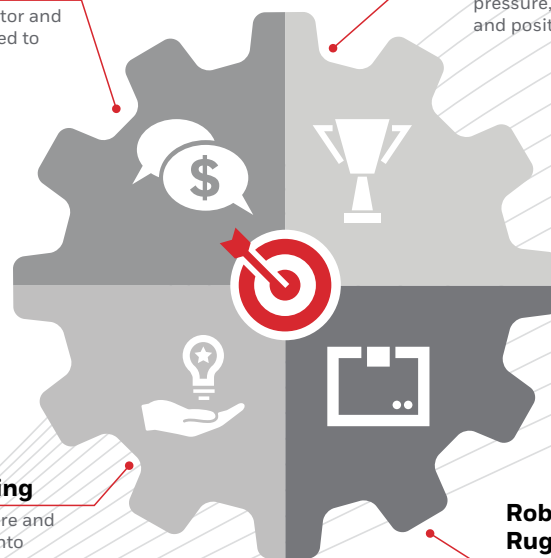
- Products can be customized to survive extremely high shock, vibration, and other environmental factors
- Unparalleled experience and library of custom switch devices for aerospace and military-grade requirements
- Environmental and hermetic protection configurations available

### Customization

Interface connector and calibration tailored to customer needs

### Technology Leadership

Best in class performance in pressure, gas, switches, speed and position offerings



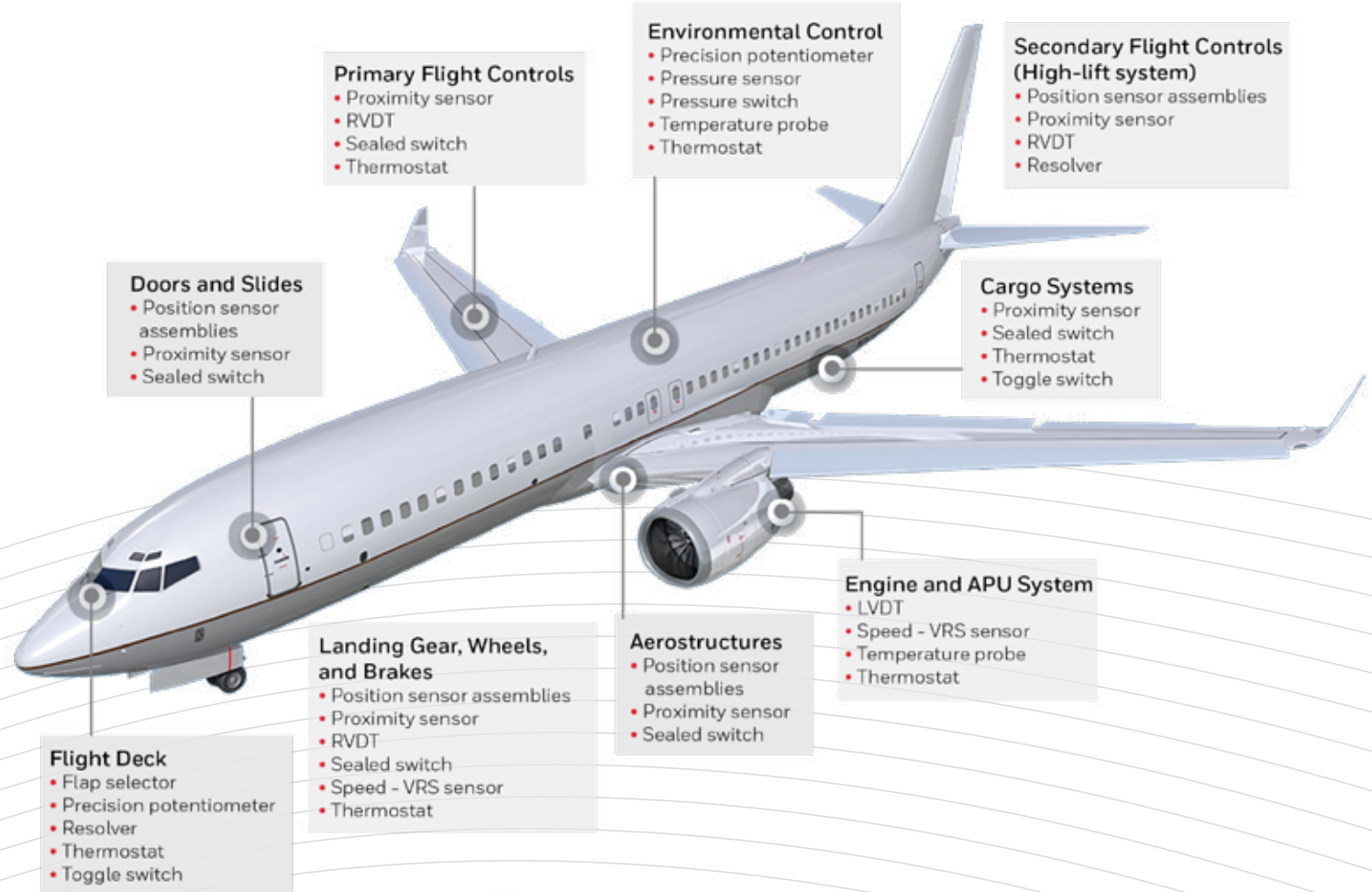
### Edge Processing

Customized firmware and easier integration into multiple applications

### Robust and Ruggedized Packaging

Products designed to operate in the most challenging and harsh environments

# COMMERCIAL AND BUSINESS AIRCRAFT



With over 60-year's experience designing and delivering aerospace products, Honeywell's core expertise includes engineering, sensor development, analog/digital electronics, and environmental packaging. Customization of existing product assemblies for customer-specific applications is a particular area of strength.

Honeywell:

- **Delivers electrical and mechanical designs quickly** for build-to-print, redesign, new design, and/or testing purposes
- **Integrates features** such as gearing, redundant channels, environmental sealing, and more
- **Creates designs** that are retrofittable while reducing component count (weight savings)

- **Meets demanding schedules** with application knowledge, world-class engineering, and global manufacturing facilities
- **Certifies and qualifies products in-house**, delivering fully compliant reports with all the required documentation
- **Offers customer support** throughout the design process, into production, and beyond



# ROTOR CRAFT



**Honeywell offers component design expertise and products for the most complex aerospace and defense applications. Our products and expertise are highly complementary to your pre-existing system and subsystem designs.**

You can depend on Honeywell for precise, accurate, and dependable solutions that have longevity for many of the harshest and most rugged environments.

Where a custom solution is required, Honeywell design engineers work directly with customers to develop and manufacture specific aerospace solutions.

The Honeywell pedigree of sensing and switching technologies is one of the broadest in the industry. Our offering includes an array of products such as position, speed and thermal sensors, as well as a broad range of electromechanical basic and toggle switches.



# MILITARY AIRCRAFT

**Honeywell aerospace products are designed to meet the most critical & complex challenges – whether it is to meet commercial industry standards 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 the key. Many Honeywell products are crucial to aircraft operation and carry MTBF (mean time between failure) beyond 500,000 hours.

Honeywell:

- **Provides a strong, supporting infrastructure** with many years of on-time aerospace delivery experience
- **Delivers configurable designs.** From simple packaged sensors to multi-function integrated assemblies, Honeywell can provide a solution

**Flight Controls Surface**

- Position sensor assemblies
- Proximity sensor
- RVDTs
- Sealed switch
- Torque sensor
- Thermostat

**Ordnance and Cargo**

- Load cell
- Proximity sensor
- Sealed switch
- Thermostat
- Toggle switch

**Environmental Control**

- Pressure sensor
- Pressure switch
- Temperature probe
- Thermostat

**Aerostructures**

- Position sensor assemblies
- Proximity sensor
- Sealed switch

**Doors**

- Position sensor assemblies
- Proximity sensor
- Sealed switch

**Airframe and Engine Testing**

- Force sensor (T&M\*)
- Pressure sensor (T&M\*)
- Torque sensor (T&M\*)
- Wireless data telemetry (T&M\*)

**Flight Deck**

- Flap selector
- Potentiometer
- Precision potentiometer
- Switch panel assemblies
- Thermostat
- Toggle switch

**Weapons System**

- Position sensor assemblies
- Potentiometer
- Proximity sensor
- Resolver
- Sealed switch
- Thermostat

**Engine and APU System**

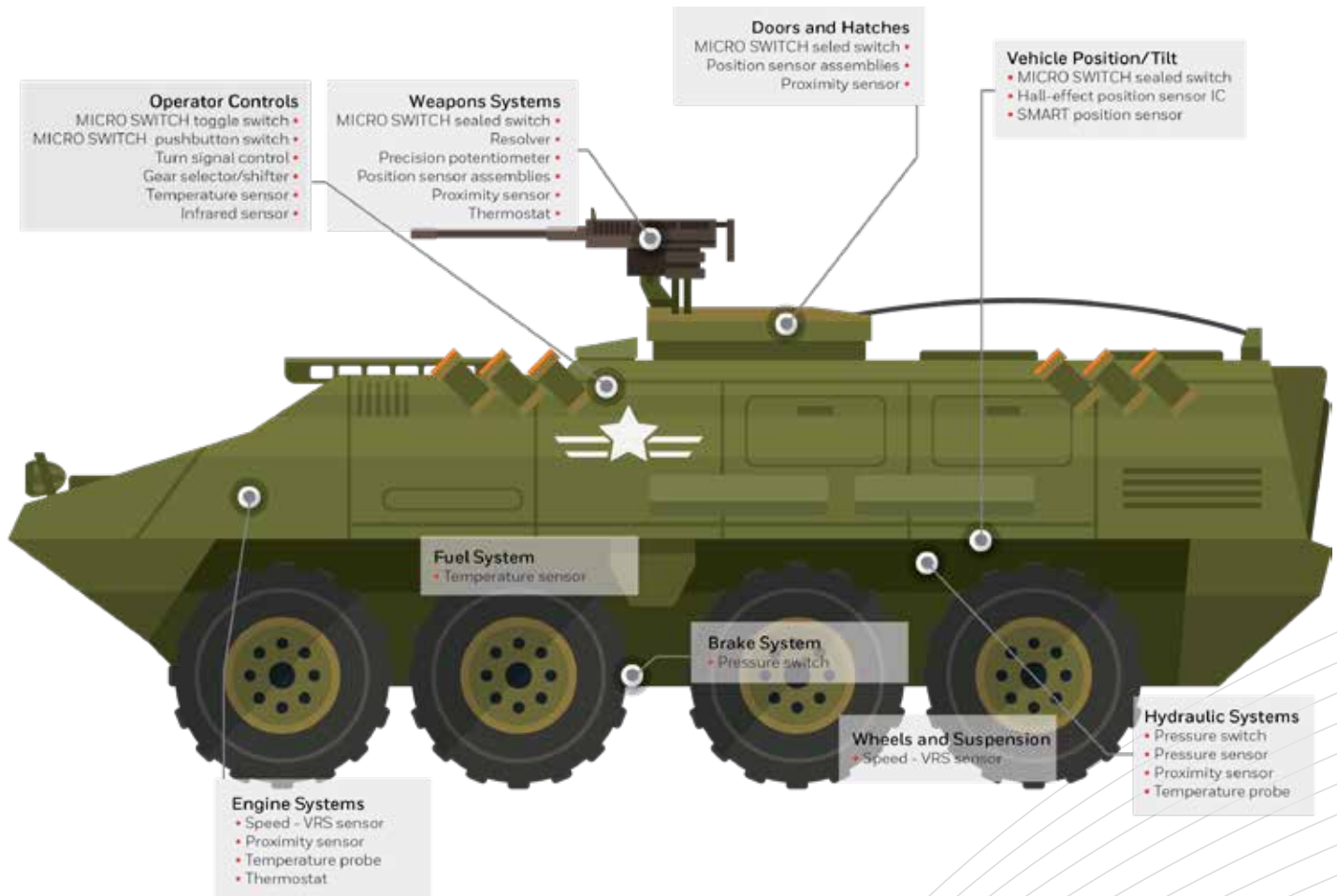
- Speed - VRS sensor
- Temperature probe
- Thermostat

**Landing Gear, Wheels, and Brakes**

- Load cell
- Position sensor assemblies
- Pressure sensor (T&M\*)
- Proximity sensor
- RVDT
- Sealed switch
- Speed - VRS sensor
- Thermostat

- **Manufactures 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



**Designed 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, you get performance levels you can rely on.**

Honeywell military-specified position sensing and temperature products monitor an armored 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 rates.







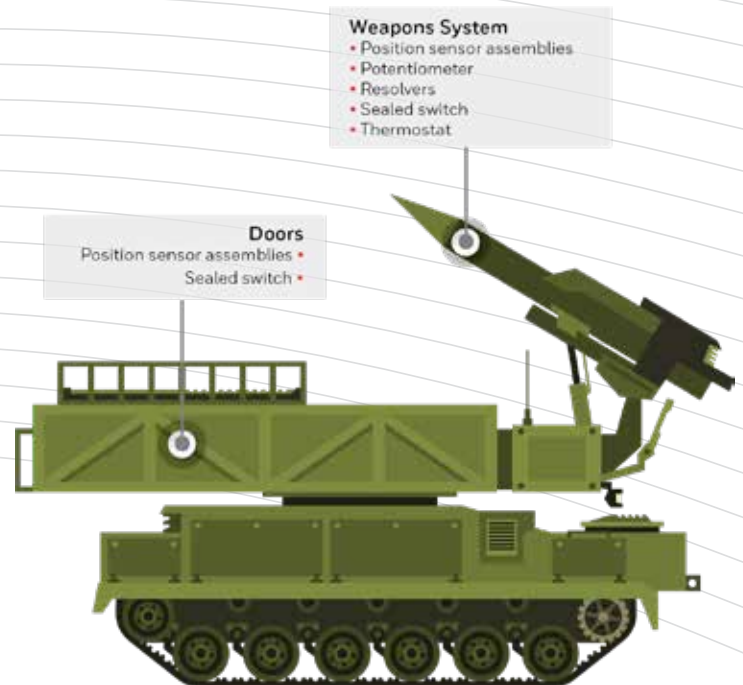
# WEAPONS SYSTEMS

**Honeywell components are utilized in military vehicles, aircraft, and launchers to optimize and control weapon systems. Given the critical nature of these applications, there is zero margin for error.**

Our highly accurate & reliable sensors, switches and control products are easily interfaced with application sub-systems. Additionally, components features are designed with flexibility, allowing for easy cross integration on different platforms.

Application examples:

- Gun aiming & targeting systems
- Multiple-launch rocket systems
- Precision point systems
- Common Remotely Operated Weapon System (CROWS)
- Lasers
- Integrated assemblies





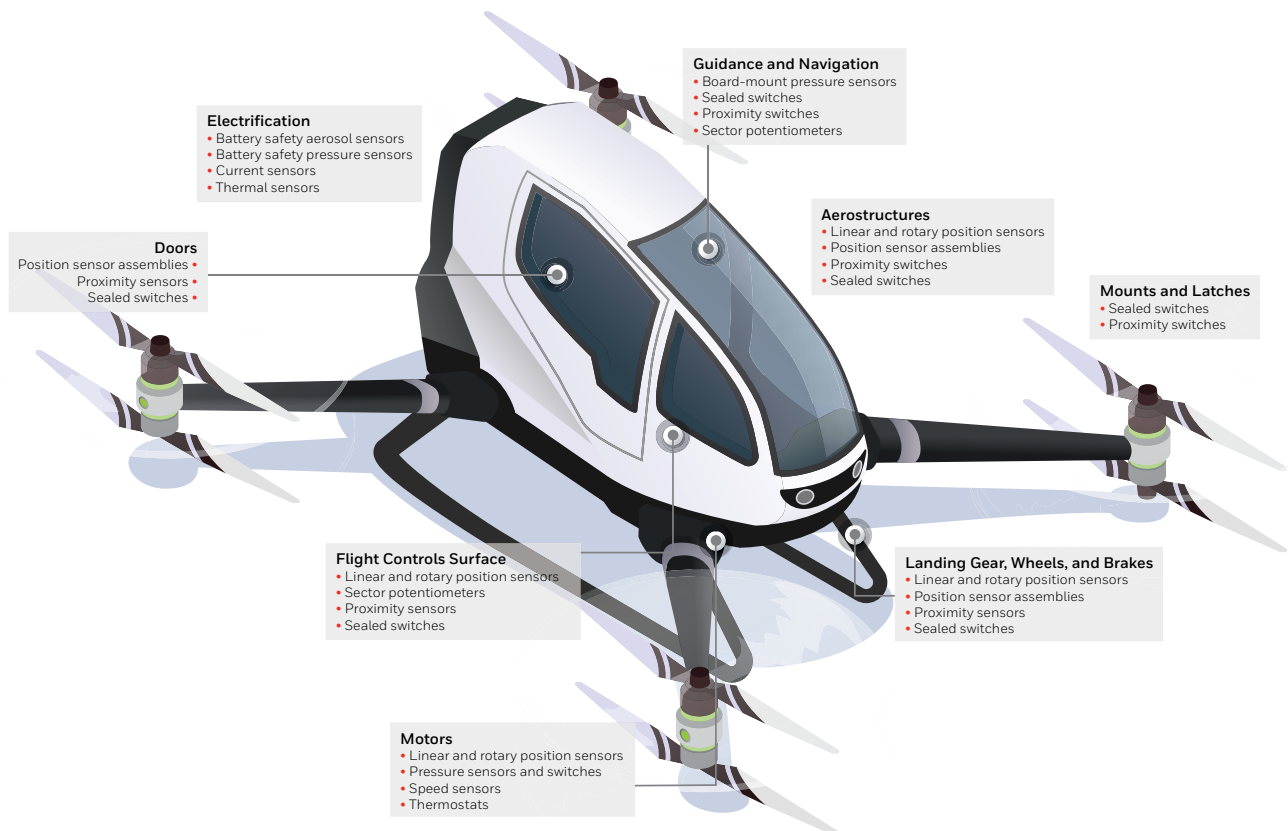
# ADVANCED AIR MOBILITY

**With decades of experience in the aerospace industry, Honeywell can provide the solutions you need for advanced air mobility applications.**

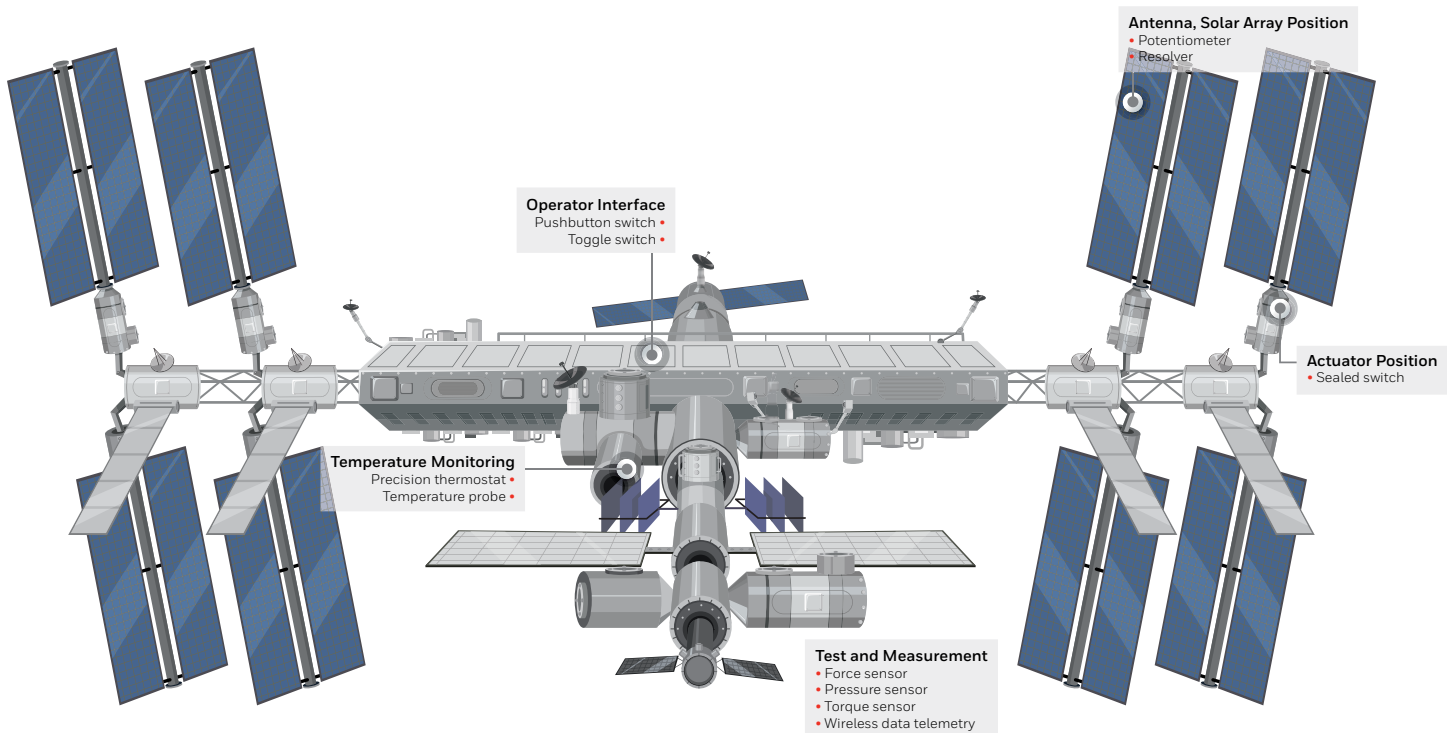
For AAM vehicles, staying within specific parameters of size, weight, and power are critical for safe and efficient operation. Battery management – including monitoring power, voltage, and temperature – is a major area of focus. Honeywell battery pressure and aerosol sensors – as well as current sensors – are key components for AAM electrification safety.

Harsh Application Proximity Sensor (HAPS) and General Aerospace Proximity Sensor (GAPS) are hermetically sealed, highly configurable, and offer optional diagnostic capability.

Our large family of ruggedly housed sealed and toggle switches meet practically any specification. Position sensor assemblies, including linear, rotary, and proximity, are often ideal for a host of AAM applications, as they afford diversity in mechanical flexibility, from basic torque telemetry to smart, advanced digital measurement.



# SPACE APPLICATIONS



**Honeywell aerospace sensors, switches and controls are designed to manage the most difficult of environments – our products and expertise are complementary to systems and subsystem designs.**

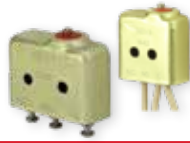
Achieving military approvals on our solutions brings a defined set of performance requirements common to the needs within the military, industrial, transportation, and medical industries. Meaning, Honeywell military-approved products have consistent and exacting specifications for shock, vibration, thermal altitude, low-temp testing, and endurance cycles specified over temperature.

Because of our advancements, high-quality products, and attention to specifications, space applications have been able to fly higher and farther, making Honeywell a key supplier within this growing industry sector. And these sensor and switch solutions can do the same for land-based applications, adding value and product assurance coupled with the Honeywell industry-wide expertise.



# 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	SE/XE	HM	HS
<b>Housing</b>	anodized aluminum	stainless steel	stainless steel, phenolic
<b>Sealing</b>	MIL-PRF-8805, symbol 3, watertight	MIL-PRF-8805, symbol 5, hermetic	MIL-PRF-8805, symbol 5, hermetic
<b>Operating temperature</b>	-53°C to 105°C [-65°F to 221°F]	-65°C to 121°C [-85°F to 250°F] high temp. option: 500°F	-54°C to 121°C [-65°F to 250°F]
<b>Actuators/ levers</b>	auxiliary actuators available	integral lever; aux. actuators: leaf, roller leaf, straight, roller lever	integral lever
<b>Termination</b>	solder, quick-connect, leadwire	solder, leadwire	screw, leadwire
<b>Circuitry</b>	SPDT	SPDT	SPDT
<b>Contacts</b>	silver, gold, bifurcated gold	silver, gold, bifurcated gold	silver
<b>Amp rating</b>	0.5 A to 7 A max.	0.5 A to 3 A	1 A to 25 A
<b>Measurements</b>	SE: 19,05 mm H × 8,64 mm W × 22,35 mm L [0.75 in H × 0.34 in W × 0.88 in L] XE: 19,05 mm H × 8,13 mm W × 15,75 mm L [0.75 in H × 0.32 in W × 0.62 in L]	12,7 mm H × 6,35 mm W × 20,3 mm L [0.5 in H × 0.25 in W × 0.8 in L]	25,4 mm H × 17,8 mm W × 50,8 mm L [1.0 in H × 0.7 in W × 2.0 in L]
<b>Features &amp; benefits</b>	<ul style="list-style-type: none"> <li>• Smallest environmentally sealed switches offered by Honeywell</li> <li>• Power loading switching capability up to 7 A</li> <li>• 4SE Series carries UL/CSA approvals</li> <li>• 4XL Series carry UL approvals</li> </ul>	<ul style="list-style-type: none"> <li>• Smallest environmentally sealed switches offered by Honeywell</li> <li>• Power loading switching capability up to 7 A</li> <li>• 4SE Series carries UL/CSA approvals</li> <li>• 4XL Series carry UL approvals</li> </ul>	<ul style="list-style-type: none"> <li>• Power load switching capability to 25 A at 28 Vdc</li> <li>• High temperature construction</li> <li>• Reduced sensitivity to changes in altitude or pressure</li> </ul>
<b>Applications</b>	<ul style="list-style-type: none"> <li>• Aircraft</li> <li>• Ordnance</li> <li>• Moist and/or dusty industrial environments</li> </ul>	<ul style="list-style-type: none"> <li>• Adverse gas or vapor environments</li> <li>• Oil drilling installations</li> <li>• Marine environments</li> <li>• Submarines &amp; stationary undersea</li> <li>• Refrigeration units</li> <li>• Aircraft and space craft</li> <li>• Earth moving machinery</li> <li>• Desert vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• Adverse gas or vapor environments</li> <li>• Aircraft and helicopters</li> <li>• Steam cleaning of food processing machines</li> <li>• Moist, dusty or oily environments</li> <li>• Industrial valve controls</li> </ul>



EN	HE	HR
stainless steel with environmental seals	hermetically sealed stainless steel	hermetically sealed stainless steel
sealed to MIL-PRF-8805 resilient, symbol 4 (also MIL-PRF-8805 QPL listings available)	MIL-PRF-8805, symbol 5, hermetic	MIL-PRF-8805, symbol 5, hermetic
-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]
top plunger, top roller, top rotary	top plunger, top roller plunger, nylon button	top plunger, top roller plunger
screw, leadwire, leadwire with connector, pin receptacle, side receptacle	screw, leadwire, bottom receptacle	screw, leadwire (receptacle termination available)
SPDT, DPDT	two or four SPDT circuits	SPNO, DPDT
silver, gold	silver, gold	silver, gold
1 A to 15 A (resistive)	1 A, 5 A, 7 A (resistive)	5 A (resistive)
bottom receptacle: 114,3 mm H × 25,4 mm dia [4.5 in H × 1.0 in dia] side receptacle: 57,2 mm H × 26,7 mm W × 58,9 mm L [2.25 in H × 1.05 in W × 2.32 in L]	top pin plunger: 60,1 mm H × 25,4 mm dia [2.36 in H × 1.0 in dia] top roller plunger: 32,8 mm H × 17,5 mm dia [1.29 in H × 0.69 in dia]	screw: 80,8 mm H × 25,4 mm dia [3.18 in H × 1.0 in dia] leadwire: 103,7 mm H × 27,0 mm dia [4.08 in H × 1.06 in dia]
<ul style="list-style-type: none"> <li>• Environmental seal resists most severe environments</li> <li>• Top plunger and roller plunger actuators have internal ice scraper ring</li> <li>• Miniature housing meets demand for smaller size and lighter weight</li> </ul>	<ul style="list-style-type: none"> <li>• True hermetic (metal-to-metal, glass-to-metal) construction</li> <li>• Designed to meet sand, dust, explosion, icing, minimum current, and moisture requirements</li> <li>• Top &amp; roller plungers have an internal ice scraper ring</li> </ul>	<ul style="list-style-type: none"> <li>• Designed to meet moisture resistance, explosion, and salt spray requirements</li> <li>• Top plungers have an internal ice scraper ring</li> <li>• Operates at low temperatures (-65°C [-85°F])</li> </ul>
<ul style="list-style-type: none"> <li>• Aircraft landing gear</li> <li>• Flap/stabilizer controls</li> <li>• Aircraft thrust engine reversers</li> <li>• Space vehicles</li> <li>• Armored personnel carriers</li> </ul>	<ul style="list-style-type: none"> <li>• Jet aircraft de-icer controls</li> <li>• Military aircraft wingfold actuators</li> </ul>	<ul style="list-style-type: none"> <li>• Aircraft engine thrust reversers</li> </ul>

# MICRO SWITCH TOGGLE SWITCHES

Hermetic and environmentally sealed pushbutton and 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	NT	TW
<b>Typical applications</b>	<ul style="list-style-type: none"> <li>• Aerial platform lifts</li> <li>• Platform lifts for trucks</li> <li>• Industrial equipment</li> <li>• Railroad locomotives and maintenance equipment</li> <li>• Construction equipment</li> <li>• Agricultural machinery</li> <li>• Syringes (end of travel)</li> </ul>	<ul style="list-style-type: none"> <li>• Military and commercial aircraft and helicopters</li> <li>• Aviation ground support equipment</li> <li>• Military land vehicles (track and wheeled vehicles)</li> <li>• Industrial machinery and construction equipment</li> <li>• Process control</li> </ul>
<b>Type</b>	commercial-grade toggle	miniature stainless steel toggle
<b>Sealing</b>	IP67/68; NEMA 3, 3R, 4 and 13	qualified to MIL-DTL-83781
<b>Operating temp.</b>	-40°C to 71°C [-40°F to 160°F]	-65°C to 71°C [-85°F to 160°F]
<b>Actuator/lever</b>	standard, locking, special design, tab	standard, locking, special design, tab
<b>Action</b>	2- or 3-position, momentary & maintained	2- or 3-position, momentary & maintained
<b>Mounting</b>	bushing 15/32 in	bushing 15/32 in or 1/4 in
<b>Termination</b>	solder, screw, quick connect	IWTS, solder, screw, quick connect, H58, T2
<b>Circuitry</b>	SPST, SPDT, DPST, DPDT, 4PST, 4PDT	SPST, SPDT, DPST, DPDT
<b>Contacts</b>	silver alloy, gold-plated	fine silver, gold-plated
<b>Amp rating</b>	up to 20 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
<b>Measurements</b>	58,4 mm H × 33,5 mm W × 22,6 mm D [2.3 in H × 1.32 in W × 0.89 in D]	49,78 mm H × 14,61 mm W × 14,61 mm D [1.96 in H × 0.575 in W × 0.575 in D]
<b>Approvals</b>	UL, CSA, CE, UKCA	UL, CSA, qualified to MIL-DTL-83781
<b>Features</b>	completely sealed switching chamber; enhanced tactile feedback	saves space and weight; sealed bushing versions



### TL

- Military and commercial aircraft: fixed wing aircraft and helicopter flight decks
- Aviation ground support equipment: pumps, lights, and lift platforms
- Military land vehicles (track and wheeled vehicles): lights, pumps, arming equipment, and lifts/ramps, etc.
- Construction equipment: road milling, road pavers, trenchers, and stump cutters

### AT

- Aircraft (commercial and military)
- Military ground vehicles
- Flight controls
- Vehicle panel controls

### ET

- Flight decks for commercial and military aircraft and helicopters

military-grade toggle

qualified to MIL-DTL-3950

-65°C to 71°C [-85°F to 160°F]

standard, special design, tab, paddle, none  
2- or 3-position, momentary & maintained

bushing 15/32 in

IWTS, solder, screw, quick connect, lead-wire

SPST, SPDT, DPST, DPDT,  
3PST, 3PDT, 4PST, 4PDT

silver alloy, gold-plated

up to 20 A (resistive)

58,4 mm H × 33,5 mm W × 22,6 mm D  
[2.3 in H × 1.32 in W × 0.89 in D]

UL, CSA, CE, UKCA, qualified to MIL-DTL-3950

environment-proof sealing;  
qualified to MIL-DTL-3950

stainless steel toggle

MIL-PRF-8805/26/98

various

standard, locking, tab, special design  
2-position, momentary & maintained

15/32 in bushing, 1/4 in bushing, 3-hole,  
above panel

solder, solder T2, screw, quick connect,  
leadwire, H58

SPDT, DPDT, DPNO, 3PDT,  
4PDT, 6PDT, 8PDT, 10PDT

silver, gold, bifurcated gold

0.01 A to 5 A (resistive)

various

qualified to MIL-PRF-8805/26/98

choice of sealed bushing;  
short behind panel depth

magnetically held toggle

most listings qualified to MIL-S-5594

-65°C to 71°C [-85°F to 160°F]

standard, pull/push-to-unlock, tab

2- or 3-position, momentary & maintained

bushing 15/32 in

screw, leadwire, turret

SPDT, DPDT, 4PDT

fine silver

7 A max. (resistive)

51,56 mm H × 25,4 mm W × 25,4 mm D  
[2.03 in H × 1.0 in W × 1.0 in D]

qualified to MIL-S-5594

holding coil replaces mechanical holding  
mechanisms to maintain toggle in operate

# LVDT

Honeywell's aero LVDT provides infinite resolution linear position solutions and is designed for use in harsh environments. The pre-validated configurable LVDT platform approach reduces design cycle time and speeds time to market.



SERIES	1LVT
<b>Range</b>	8,89 mm to 35,56 mm [0.35 in to 1.4 in] stroke
<b>Channels</b>	single, dual, and dual-tandem
<b>Housing material</b>	17-4 PH stainless steel
<b>Electrical connections</b>	EN2997YE01005MN, M83723/88P1005N, D38999/27YB5
<b>FAccuracy</b>	±0.5% of the full stroke gain from 0 % to 100 % of the LVDT stroke @ 21 °C [70 °F]
<b>MTBF</b>	1 million hours min.
<b>Current consumption</b>	11 mA max.
<b>Input impedance</b>	650 ohms min. @ 3000 Hz
<b>Output impedance</b>	2000 ohms max. @ 3000 Hz
<b>Mechanical stroke</b>	0,254 mm [0.010 in] (additional to electrical stroke)
<b>Normal temperature operating range</b>	-55°C to 200°C [-67°F to 392°F]
<b>Features</b>	rig point position eliminates need to shim during installation; series has improved mean time between failure (MTBF) through industry-leading winding techniques, high-strength materials, and industry-leading design



# HAWK 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. Often used in ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position apps.



SERIES	HONEYWELL HAWK™ 1-INCH	HONEYWELL HAWK™ 3-INCH
<b>Type</b>	fully housed	multiple configurations: pancake (bare and simple housed), fully housed, and configurations with rotary transformers
<b>Size diameter</b>	1.06 in	2.75 in, 3.0 in
<b>Speed</b>	1X	1X; 1X and 16X
<b>Accuracy</b>	±7 arcmin	±420 arcsec (1X); ±25 arcsec (16X)
<b>Transformation ratio</b>	–	1X: 1.0; 16X: 0.25
<b>Operating temperature range</b>	50.8°C to 93.3°C [-60°F to 200°F]	50.8°C to 93.3°C [-60°F to 200°F]
<b>Measurements</b>	1.06 in dia. x 2.77 in L	various
<b>Features</b>	non-contact magnetic technology eliminates mechanical contact, reducing wear and improving reliability and durability by enhancing operation in harsh environments; meets multiple military/aerospace specifications: DO-160D, MIL-STD-202G, MIL-STD-810G, MIL-STD-81963B, MIL-STD-461F; complies with space outgassing requirement SP-R0022	non-contact magnetic technology eliminates mechanical contact, reducing wear and improving reliability and durability by enhancing operation in harsh environments; meets multiple military/aerospace specifications: DO-160D, MIL-STD-202G, MIL-STD-810G, MIL-STD-81963B, MIL-STD-461F; complies with space outgassing requirement SP-R0022

# PROXIMITY SENSORS

Broad range of robust operational capabilities and package sizes allow added flexibility in applications including ordnance, marine, offshore and aircraft cargo systems.



SERIES	100 FW	200 FW
<b>Description</b>	one-piece 5/8 in proximity sensor	one-piece 5/8 in proximity sensor
<b>Technology</b>	ECKO	hall
<b>Target material</b>	all metals	magnet
<b>Load current</b>	120 mA, 50 mA lamp	100 mA, 50 mA lamp
<b>Supply current</b>	20 mA max. @ 25 °C	20 mA max. @ 25 °C
<b>Supply voltage</b>	18 Vdc to 32 Vdc	18 Vdc to 32 Vdc
<b>Sensing face</b>	shielded, unshielded	shielded
<b>Housing material</b>	stainless steel	stainless steel
<b>Guaranteed actuation distance</b>	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]
<b>Operating frequency</b>	–	–
<b>Operating temperature range</b>	-55°C to 125°C [-67°F to 257°F]	-54°C to 100°C [-65.2°F to 212°F]
<b>Supply voltage</b>	18 Vdc to 32 Vdc	18 Vdc to 32 Vdc
<b>Output type</b>	normally open, current sinking	normally open/closed, current sinking
<b>BIT diagnostics</b>	–	–
<b>Short circuit</b>	–	–
<b>Pressure proof</b>	–	–
<b>Reverse polarity</b>	–	–
<b>MTBF (hours)</b>	–	–
<b>Approvals</b>	FM Class 1, Division 2, Groups A, B, C, D	FM Class 1, Division 2, Groups A, B, C, D
<b>Measurements</b>	sensing face: 5/8 in × 63,5 mm L [2.5 in L]	sensing face: 5/8 in × 63,5 mm L [2.5 in L]
<b>Features</b>	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
ferrous metals	–	–	–
750 mA	20 mA	20 mA	–
65 mA max.	25 mA	25 mA	–
18 Vdc to 32 Vdc	18 Vdc to 32 Vdc	18 Vdc to 32 Vdc	–
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 × 31,8 mm L [Ø 0.44 in × 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

# PROXIMITY SENSORS

General Aerospace Proximity Sensors (GAPS) and Harsh Aerospace Proximity Sensors (HAPS), incorporate Honeywell's patented Integrated Health Monitoring functionality, however the products have some technical differences that allow them to be used in various aerospace applications. GAPS can be used in less harsh areas of application with some differences of electrical and environmental characteristics when compared to HAPS. Whilst, HAPS Aerospace Proximity Sensors are configurable, non-contact, hermetically sealed devices designed to sense the presence or absence of a target in harsh-duty aircraft applications.



SERIES	GENERAL AEROSPACE PROXIMITY SENSOR (GAPS)	HARSH APPLICATION PROXIMITY SENSOR (HAPS)
<b>Description</b>	configurable one piece 5/8 in proximity sensor	configurable one piece 5/8 in proximity sensor
<b>Technology</b>	FAVCO with integral health monitoring option	FAVCO with integral health monitoring option
<b>Target (typ.)</b>	SS 17-4PH rectangular target with dimensions 25 mm x 18 mm x 3 mm [0.98 in x 0.71 in x 0.12 in]	SS 17-4PH rectangular target with dimensions 25 mm x 18 mm x 3 mm [0.98 in x 0.71 in x 0.12 in]
<b>Connector/leads</b>	D38999/25YA98PN D38999/25YA98PA EN2997Y10803MN	<ul style="list-style-type: none"> <li>• D38999/25YA98PN</li> <li>• EN2997Y10803MN</li> <li>• M83723/90Y10056</li> <li>• M83723/90Y10058</li> </ul> <ul style="list-style-type: none"> <li>• D38999/25YA98PA</li> <li>• M83723/90Y1005N</li> <li>• M83723/90Y10057</li> <li>• Pigtail</li> </ul>
<b>Form factor</b>	<ul style="list-style-type: none"> <li>• Inline, cylindrical, threaded</li> <li>• Right angle, cylindrical, threaded</li> <li>• Inline, cylindrical, flanged</li> <li>• Right angle, cylindrical, flanged</li> </ul>	<ul style="list-style-type: none"> <li>• Inline, cylindrical, threaded</li> <li>• Right angle, cylindrical, threaded</li> <li>• Inline, cylindrical, flanged</li> <li>• Right angle, cylindrical, flanged</li> </ul>
<b>Supply voltage</b>	12 Vdc to 32 Vdc (input)	12 Vdc to 28 Vdc
<b>Supply current</b>	<10 mA	<10 mA
<b>Sensing face</b>	Inconel®	Inconel®
<b>Housing material</b>	stainless steel	stainless steel
<b>Guaranteed actuation distance</b>	see Figure 3 in datasheet for curve	see Figure3 in datasheet for curve
<b>Operating temperature range</b>	-55°C to 115°C [131°F to 239°F]	-55°C to 115°C [131°F to 239°F]
<b>Output type</b>	see datasheet	see datasheet
<b>Internal Health Monitoring</b>	available	available
<b>Short circuit protection</b>	available	available
<b>Reverse polarity protection</b>	available	available
<b>MTBF (hours)</b>	500,000 flight hours	500,000 flight hours
<b>Approvals</b>	DO-160	DO-160
<b>Measurements</b>	see datasheet	see datasheet
<b>Features</b>	integrated health monitoring, hermetic, all metal package; high degree of vibration, EMI, and lightning protection; lead wire or connector termination; range of configurable features; preferred device for onboard aircraft applications	integrated health monitoring, hermetic, all metal package; high degree of vibration, EMI, and lightning protection; lead wire or connector termination; range of configurable features; preferred device for onboard aircraft applications

# 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, and gear-speed measurement.



SERIES	AEROSPACE SPEED
Output voltage range	4 Vp-p to 500 Vp-p (inclusive)
Housing diameter	3/8 in to 15/16 in
Housing material/style	stainless steel threaded or smooth
Termination	MS3106, D38999, M83723 connectors and leadwires
Operating temperature range	-73 °C to 232 °C [-100 °F to 450 °F]
Coil resistance	10 Ohm to 2300 Ohm
Inductance	2 mH to 600 mH
Gear pitch range	various
Min. surface speed	0,38 ms [15 in/s] typ.
Max. operating freq.	50 kHz
Vibration	MIL-STD-810G, Method 514
Features	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available

# PRESSURE SWITCHES

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



SERIES	1HP
Pressure connection	MS33656E4; MS33514E4; MS33656E3; AS5202-04
Measurement	gage, sealed gage
Construction	stainless steel
Pressure range	150 psi to 5000 psi
Output signal	28 Vdc excitation
Accuracy	set point precision: ±10 %
Amplified	no
Temp. range	-55°C to 70°C [-67°F to 158°F]
Termination	back exit, M22759/7-20 wire; right angle exit, M27759-7-20 wire; MS3106A-10SL-3S connector
Measurements	Ø 21 mm × 70 mm L [Ø 0.825 in × 2.77 in L]
Approvals	qualified to RTCA DO-160D; MIL-PFR-8805 rated switch mechanism
Features	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

# 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	3153 HERMETIC
<b>Description</b>	custom packaged	hermetic low silhouette
<b>Amperage</b>	dependent on the internal device	2.0 A/2.0 A/1.0 A
<b>Housing material</b>	stainless steel or brass	steel housing hermetically sealed with glass-to-metal seal at terminal junction
<b>Operating temperature range</b>	-29°C to 260°C [-20°F to 500°F]	-29°C to 176°C [-20°F to 350°F]
<b>Environmental exposure range</b>	-62°C to 288°C [-80°F to 550°F]	-65°C to 260°C [-85°F to 500°F]
<b>Dielectric strength</b>	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case	MIL-STD-202, Method 301; 1250 Vac 60 Hz - terminal to case
<b>Insulation resistance</b>	MIL-STD-202, Method 302; 50 MOhm min. terminal to case	MIL-STD-202, Method 302; Cond. B - 50 MOhm - 500 Vdc applied
<b>Contact resistance</b>	MIL-STD-202, Method 307; 0.050 Ohm	MIL-STD-202, Method 307; 0.050 Ohm
<b>Hermetic seal</b>	MIL-STD-202, Method 112; Cond. A, $1 \times 10^{-5}$ atm cc/s	MIL-STD-202, Method 112; Cond. C
<b>Moisture resistance</b>	MIL-STD-202, Method 106	MIL-STD-202, Method 106
<b>Shock</b>	MIL-STD-202, Method 213; 100 G	MIL-STD-202, Method 213; 100 G
<b>Vibration</b>	MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 20 G
<b>Thermal shock</b>	MIL-STD-202, Method 107; Cond. B	MIL-STD-202, Method 107; Cond. B
<b>Salt spray</b>	MIL-STD-202, Method 101; Cond. B	MIL-STD-202, Method 101; Cond. B
<b>Acceleration</b>	-	-
<b>Approvals</b>	customer specific and MIL-PRF-24236	Meets or exceeds requirements of MIL-PRF-24236
<b>Features</b>	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



3200 AEROSPACE	3500 SERIES	3MS1 SERIES
aerospace	military thermostat	QPL series military thermostats
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
-51°C to 163°C [-60°F to 325°F]	-46°C to 204°C [-50°F to 400°F]	-46°C to 190°C [-50°F to 375°F]
-65°C to 177°C [-85°F to 350°F]	-65°C to 260°C [-85°F to 500°F]	-65°C to 260°C [-85°F to 500°F]
MIL-STD-202, Method 301; 1250 Vac	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 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm	MIL-STD-202, Method 302; 500 MOhm
MIL-STD-202, Method 307; 0.025 Ohm max.	MIL-STD-202, Method 307; 0.050 Ohm max.	MIL-STD-202, Method 307; 0.050 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; 750 G	MIL-STD-202, Method 213; 400 G	MIL-STD-202, Method 213; 100 G
MIL-STD-202, Method 204; 30 G; MIL-STD-202, Method 214; 50 G	MIL-STD-202, Method 204; 20 G	MIL-STD-202, Method 204; 20 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-S-24236	meets or exceeds requirements of MIL-PRF-24236	MIL-PRF-24236/1 and QPL
gold-flashed contacts available for low-power/current applications; hermetically sealed; tight tolerances and differentials; pre-set and tamper proof; SPST contacts	hermetically sealed; tight tolerances and differentials; hi-rel	hermetically sealed; tight tolerances and differentials; hi-rel; QPL listed

## 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.

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