

TRANSPORTATION APPLICATIONS

Product Range Guide



QC07

Honeywell

TRANSPORT YOUR BUSINESS TO A BETTER PLACE: LEADING THE RACE

HONEYWELL IS COMMITTED TO PROVIDING THE RIGHT PRODUCT FOR YOUR APPLICATION.

Whether you need a standard product or a highly customized solution, our sales and engineering teams have decades of experience in the Transportation industry. We understand your applications and work diligently to ensure we provide a solution that optimally meets your technical and financial needs. Our combination of a broad product portfolio, deep technical capabilities and extensive application experience culminates into a powerful ability to meet your design needs.

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SERVING THE TRANSPORTATION INDUSTRY

Operator Controls

- Hour meter
- Key switch
- Push-pull switch
- Shifter
- Toggle switch
- Turn signal control

Engine Systems

- Pressure sensor
- Pressure switch
- Speed sensor
- Temperature probe
- Thermostat

Fuel Systems

- Pressure transducer
- Temperature sensor

Vehicle Temperature Sensing, and Engine Testing

- Force sensor
- Pressure sensor
- Torque sensor
- Wireless data telemetry

Brake Systems

- Pressure sensor
- Pressure switch
- Speed sensing

Hydraulic Systems

- Pressure sensor
- Pressure switch
- Speed sensor
- Temperature probe

Wheels and Suspension Systems

- Limit switch
- Position sensor assemblies
- Potentiometer
- Pressure transducer
- Pressure switch
- Resolver
- Sealed switch
- Speed sensor
- Thermostat

Vehicle Position and Tilt

- Limit switch
- Position sensor
- Sealed switch
- Inertial measurement unit
- Wireless solutions



Heavy Duty On & Off Road



Material Handling Equipment



Mining and Construction



Sport Vehicle



Lawn and Garden



Power Generation

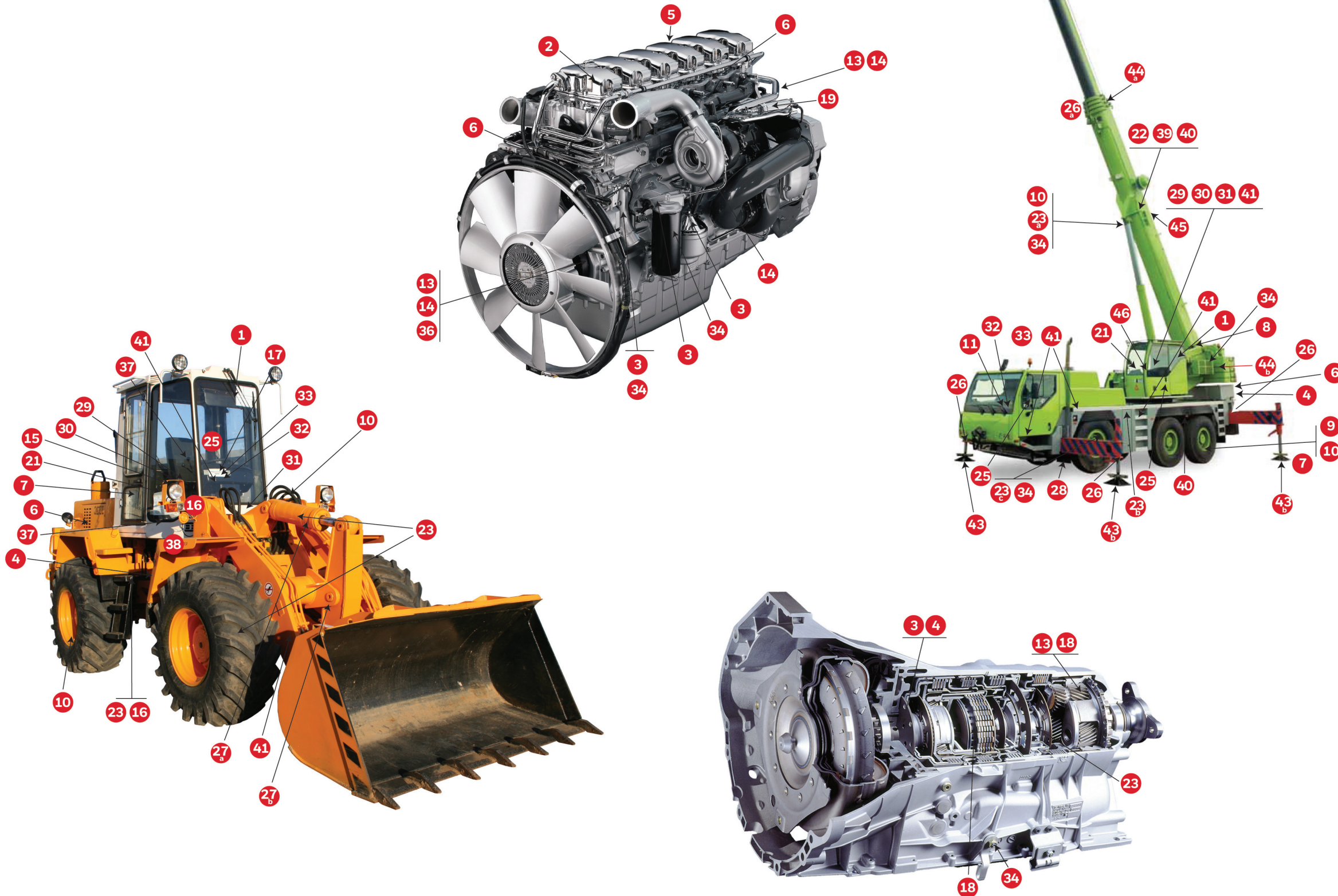


Rail



Agricultural

SENSOR, SWITCH & CONTROL APPLICATIONS



	Description
1	Temperature sensor (cabin temperature sensing) - ES-110 Series
2	Temperature sensor (air inlet sensing) - ES-110 Series
3	Temperature sensor (oil, coolant, and fuel temperature sensing) - R300, and 500 Series
4	Temperature sensor (hydraulic oil temp sensing) - R300 Series
5	Temperature sensor (exhaust gas recirculation sensing) - R300 Series
6	Thermostat (fan control and fire suppression sensing) - 3000 Series
7	Hall-effect position sensor (jack position sensing) - 103SR & 4AV19F
8	Position sensor (boom angle position sensing) - SPS, RTP & RTY Series
9	Speed sensor (wheel speed sensing) - SNDH, SNG-S Series
10	Speed sensor (wheel and hydraulic pump speed sensing) - SNDH, SNG-S Series
11	Angular or linear Hall-effect position sensor IC (power steering control system sensing) - APS00B, SS490, and RPN Series
12	Hall-effect speed sensor (cam/crankshaft sensor/ABS) - SNDH-H Series
13	Speed sensor (RPM and speedometer/MPH sensing) - VRS, SNDH, SNG-S and LCZ Series
14	Speed sensor (RPM/speedometer/MPH, camshaft/crankshaft, and turbocharger speed sensing) - VG481V1, SNDH-H, SNG-S Series
15	Bipolar Hall-effect sensor IC (power seat motor) - SS400, SS41, SS360/SS460 Series
16	Linear Hall-effect sensor IC (stability control system and remote mirror with memory control) - VF495A1-SP, SS490 Series
17	Angular or linear Hall-effect sensor IC (power steering control system) - APS00B, SS490, SS39ET Series
18	Speed/direction sensor (forward/reverse sensing) - SNDH-T, SNG-Q Series
19	Linear Hall-effect sensor IC (throttle position sensing) - VF495A1-SP, SS490, SS39ET Series
20	Rotary position sensor (gear position detection/throttle by wire) - RTY Series
21	Position sensors Inertial Measurement Units (IMU) - TARS Series
22	SMART position sensor (boom positioning) - SMART Arc 145° Series
23	Heavy-duty pressure transducer 23a. hydraulic sensing; 23b. fuel tank level sensing; 23c. braking system sensing - PX3, PX2, MLH, 13mm, 19mm, SPT Series
24	Handlebar controls (multi-function switch) - 1080HD Series & Custom
25	Smart key (limits function by operator's certification level)
26	Heavy-duty pressure transducer or T&M pressure sensor (Outrigger load sensing - minimum of four; maximum of six) - MLH Series
27	SMART position sensor (vehicle and load sensing) 27a. SPS Linear; 27b. SPS Rotary
28	SMART position sensor (steering angle sensing) - SPS Series
29	Hour meter (usage tracking) - LM Series
30	Key switch (on/off)
31	Push-pull switch (emergency stop)
32	Shifter (forward-neutral-reverse) - 81248
33	Turn signal - multi-purpose
34	Pressure switch (hydraulic system and engine oil monitoring) - HP, MH, ME, LP, LE Series
35	Pressure switch (brake switch indicator) - Series 1000
36	Vacuum switch (airflow monitoring) - 5000 Series
37	MICRO SWITCH limit switch (back-up alarm) - BZE Series
38	MICRO SWITCH limit switch (level sensor for cab position) - GLS Series
39	MICRO SWITCH limit switch (machine position) - HDLS Series
40	MICRO SWITCH limit switch (jib, wheelbock, and outrigger position indicator) - GLS Series
41	MICRO SWITCH toggle switch (manual operator switch) - NT Series
42	MICRO SWITCH basic switch (watertight) (brake switch indicator) - V15W Series
43	Load cell or load pins 44a. (hook load sensing); 44b. (outrigger load sensing, min. of 4/max of 6)
44	Load cell 45a. (torsion or boom side load sensing); 45b. provides counterweight information to operator
45	Load pin (replaces hydraulic cylinder pins)

SENSOR, SWITCH & CONTROL APPLICATIONS



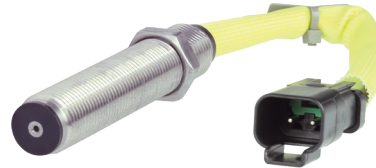
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SPEED & DIRECTION SENSORS

Provides true zero speed capability, direction sensing, and precise switch point measurement. Speed sensor diagnostics provide information on air gap and sensor failure for increased reliability and functionality. A comprehensive line-up of Hall-effect, magnetoresistive, and variable reluctance sensors.



SERIES	SNG-Q	SNDH-T	SNG-S	SNDH-H	LCZ
Description	quadrature speed and direction sensor with 4-wire output	dual differential Hall-effect quadrature speed and direction sensor	single Hall-effect speed sensor	Hall-effect speed sensor	single Hall-effect zero speed sensor
Housing	PBT	stainless steel, plastic	plastic	stainless steel, plastic	stainless steel
Supply voltage range	4.5 V to 26 V	4.5 Vdc to 18 Vdc	4.5 V to 24 V, 4.8 V to 24 V, 4.8 V to 16 V, 8 V to 16 V	4 Vdc to 24 Vdc, 4.5 Vdc to 24 Vdc, 6.5 Vdc to 24 Vdc	4.5 Vdc to 26 Vdc
Supply current	2 mA normal typ., 18 mA max.	18 mA max.	15 mA, 0 mA max.	6 mA max., 14 mA max., 20 mA max.	20 mA
Output type	square wave	square wave	open collector, square wave	digital sinking	digital sinking
Operating frequency range	3 Hz to 20 kHz	1 Hz to 15 kHz	0 kHz to 15 kHz	0 Hz to 12 kHz, 0 Hz to 15 kHz, 2 Hz to 15 kHz	0 Hz to 15 kHz
Operating temperature range	-40°C to 150°C [-40°F to 302°F]	-40°C to 150°C [-40°F to 302°F]	-40°C to 140°C [-40°F to 284°F]	-40°C to 150°C [-40°F to 302°F] inclusive	-40°C to 125°C [-40°F to 257°F]
Measurements	Probe dimensions: • Ø15 mm x 35 mm L [Ø0.59 in x 1.38 in L] • Ø15 mm x 45 mm L [Ø0.59 in x 1.77 in L]	Ø 15 mm x 45 mm L [Ø 0.6 in x 1.77 in L]	Probe dimensions: • Ø14,91 mm x 24 mm L [Ø0.59 in x 0.94 in L] • Ø13,90 mm x 46 mm L [Ø0.55 in x 1.81 in L] • Ø13,90 mm x 67 mm L [Ø0.55 in x 2.64 in L]	various, depends upon type	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
Features	design and manufacturing platform-based approach enables cost-competitiveness and mechanical and electrical configurability, designed for potential applications where enhanced accuracy is required to detect small target features	advanced performance dynamic offset self calibration; short circuit and reverse voltage protection; low jitter output; near zero speed	IP69K rating, robust electrical noise immunity, O-ring seal enables environmental sealing to mounting surface, wide operating temperature range, cost-competitive, insensitive to orientation (angular rotation) during assembly, zero speed detection	rotationally insensitive versions available; zero speed sensing versions available; range of connector options	omni-directional sensor to target; low power consumption; zero speed; digital output



SERIES	THRUMOLD SERIES - HIGH VOLTAGE OUTPUT	THRUMOLD SERIES - LOW VOLTAGE OUTPUT
Output voltage, min.	39 Vp-p ±9 Vp-p	28 Vp-p ±7 Vp-p
Thread size	M18 X 1.5 6G, 5/8-18 UNF-2A, 3/4-16 UNF-2A, M16 X 1.5 6G	M18 X 1.5 6G, 5/8-18 UNF-2A, 3/4-16 UNF-2A, M16 X 1.5 6G
Housing material	stainless steel, aluminum, anodized aluminum	stainless steel
Termination	Deutsch DT04 connector	Deutsch DT04 connector
Operating frequency	15 kHz typ.	15 kHz typ., 40 kHz typ.
Operating temperature range	-40°C to 120°C [-40°F to 248°F]	-40°C to 120°C [-40°F to 248°F]
Vibration	20 G RMS from 24 Hz to 2000 Hz >50 MOhm	20 G RMS from 24 Hz to 2000 Hz >50 MOhm
Features	self-powered operation; simple installation; no moving parts; operates over wide speed range; customized versions available	

SMART POSITION SENSORS

Honeywell's SMART Position Sensors are some of the most durable and adaptable position devices available in the industry today. Their simple, non-contact design eliminates mechanical failure mechanisms, reduces wear and tear, improves reliability and durability and enhances operator efficiency and safety, while minimizing downtime.



SERIES	SMART Arc CAN	SPS LINEAR	SPS ARC	SPS ROTARY
Description	utilizes magnetoresistive technology to detect the position of a magnet relative to the sensor, within a sensing range of 0° to 145°	measures linear movement of a magnet attached to a moving object	measure angular movement of a magnet attached to a moving object	measures rotary movement of a magnet attached to a moving object
Configuration	145°	linear	arc	rotary
Sensing range	0° to 145°	75 mm: 0 mm to 75 mm [0 in to 3.0 in]; 225 mm: 0 mm to 225 mm [0 in to 8.86 in]	100°: 0° to 100° 180°: 0° to 180°	0° to 360°
Resolution	0.02°	75 mm analog: 0,05 mm [0.002 in]; 225 mm analog: 0,14 mm [0.0055 in]; 225 mm digital: 0,0035 mm [0.000137 in]	100°: 0.06° 180°: 0.11°	0.01°
Supply voltage	9 V to 36 V	6 Vdc to 24 Vdc	6 Vdc to 24 Vdc, 18 Vdc to 24 Vdc	12 mA to 30 mA
Supply current	100 mA	75 mm analog: 32 mA max. 225 mm analog: 34 mA max. 225 mm digital: 88 mA max.	45 mA max.	90 mA max.
Output	CAN-2.0B SAE J1939	75 mm and 225 mm analog: 0 Vdc to 5 Vdc 225 mm digital: RS-232 type	0.5 Vdc to 4.5 Vdc	4 mA to 20 mA
Air gap	Sensor-161: 5,25 mm [0.21 in] Sensor-220: 6,75 mm [0.27 in]	3,0 mm ±2,5 mm [0.118 in ±0.098 in]	100°: 7,8 mm ±2,5 mm [0.307 in ±0.098 in]; 180°: 8,5 mm ±2,5 mm [0.338 in ±0.098 in]	3,0 ±2,0 mm [0.118 ±0.079 in]
Operating temp. range	-40°C to 85°C [-40°F to 185°F]	-40°C to 125°C [-40°F to 257°F]	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]
Storage temp. range	-55°C to 105°C [-67°F to 221°F]	-40°C to 150°C [-40°F to 302°F]	-40°C to 150°C [-40°F to 302°F]	-40°C to 150°C [-40°F to 302°F]
Termination	Deutsch DT06-04	flying leads	M12 connector (4-pin), flying leads	M12 connector (male 5-pin)
Sealing	IP68, IP69K	IP67, IP69K	IP67, IP69K	IP69K
Housing material	RoHS-compliant materials meet Directive 2002/95/EC	thermoplastic	thermoplastic	aluminum with powder coating
Approvals	CE	CE, UKCA	CE, UKCA	CE, UKCA
Measurements	Sensor-161: Ø171,5 mm [Ø6.75 in] Sensor-220: Ø233,50 mm [Ø 9.19 in] cable length 1000 mm ±20 mm	75 mm: 145 mm L x 18,0 mm W x 28,2 mm H [5.7 in x 0.71 in x 1.1 in]; 225 mm: 287,3 mm L x 18,0 mm W x 28,2 mm H [11.3 in x 0.71 in x 1.1 in]	100°: 183 mm L x 86 mm W x 31 mm H [7.20 in x 3.39 in x 1.22 in] 180°: 222 mm L x 107 mm W x 31 mm H [8.74 in x 4.21 in x 1.22 in]	113,5 mm x 106,5 mm x 22,0 mm [4.46 in x 4.19 in x 0.87 in]
Features	145° configuration; linearity down to 0.3 %; CAN-2.0B SAE J1939 output	analog or digital output; small size; self diagnostics; IP67 and IP69K sealing	analog output; self diagnostics; IP67 and IP69K sealing	analog output, IP67 and IP69K sealing

POSITION SENSORS INERTIAL MEASUREMENT UNITS (IMU)

High-end position sensors with sensitive multi-axis motion control. IMUs measure the motion of the equipment onto which they are attached and deliver the data to the equipment's control module, allowing the operator to focus on other equipment functions, enabling more precise control than can be achieved by using only the human eye, thus increasing safety, stability and productivity.

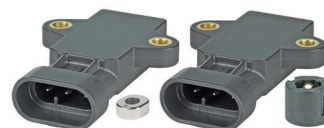


TARS SERIES

Description	6 degrees of freedom, 6-D motion variant
Angular rate range	-245 deg/s to +245 deg/s
Supply voltage	<ul style="list-style-type: none"> • TARS-LCASS: 4.5 V to 5.5 V • TARS-HCASS: 9 V to 36 V
Supply current	100 mA max.
Startup time	500 ms min. to 2000 ms max.
Output type	SAEJ1939 CAN 29
Operating temperature range	-40°C to 85°C [-40°F to 185°F]
Accelerometer range	-78.48 m/s ² to +78.48 m/s ²
Accelerometer resolution	0.01 m/s ²
Sealing	IP67, IP69K
Housing material	PBT thermoplastic
Approvals/testing/qualifications	EMI/EMC, ESD, mechanical and thermal shock, random vibration, humidity, salt spray, chemical compatibility, automotive grade
Dimensions (diameter x height)	Ø138 mm x 28 mm [Ø5.433 in x 1.102 in]
Features	high performance IMU; reports vehicle angular rate, acceleration and inclination (6 degrees of freedom); advanced filtering of raw sensor data; improves positioning accuracy; optional metal guard for added protection; may be pre-configured at the Honeywell factory for immediate installation out of the box or be delivered with customizable firmware that allows manufacturers to use a single part number across vehicles and applications; may be customized to best meet application needs using the TARS Configurator Tool (TCT) software to change selected parameters such as broadcast rate, orientation, and filter settings.

ROTARY POSITION SENSORS NON-CONTACT HALL-EFFECT SENSORS

Respond to the presence or to the interruption of a magnetic field, using a solid-state, Hall-effect IC to sense rotary movement of the actuator shaft and then producing a proportional output. The IC, circuitry and magnets are galvanized with an integral connector – more than a match for the most unforgiving conditions.



	RTY SERIES	RTP SERIES
Sensing range	50° (±25°), 60° (±30°), 70° (±35°), 90° (±45°), 120° (±60°), 180° (±90°), 270° (±135°), 360° (±180°)	50° (±25°), 60° (±30°), 70° (±35°), 90° (±45°), 120° (±60°), 180° (±90°), 270° (±135°), 350° (±175°), 360° (±180°)
Input voltage	<ul style="list-style-type: none"> • low voltage: 5 Vdc ±0.5 Vdc • high voltage: 10 Vdc to 30 Vdc 	<ul style="list-style-type: none"> • low voltage: 5 Vdc ±0.5 Vdc • high voltage: 10 Vdc to 30 Vdc
Output	<ul style="list-style-type: none"> • low voltage: 0.5 V to 4.5 V ratiometric (standard), 4.5 V to 0.5 V ratiometric (inverted) • high voltage: 0.5 V to 4.5 V ratiometric (standard), 4.5 V to 0.5 V ratiometric (inverted) 	<ul style="list-style-type: none"> • low voltage: 0.5 V to 4.5 V ratiometric (standard), 4.5 V to 0.5 V ratiometric (inverted) • high voltage: 0.5 V to 4.5 V ratiometric (standard), 4.5 V to 0.5 V ratiometric (inverted)
Input current	<ul style="list-style-type: none"> • low voltage: 20 mA max.; during output to ground short, 25 mA max. • high voltage: 32 mA max.; during output to ground short, 47 mA max. 	<ul style="list-style-type: none"> • low voltage: 20 mA max.; during output to ground short, 25 mA max. • high voltage: 32 mA max.; during output to ground short, 47 mA max.
EMI/EMC	<ul style="list-style-type: none"> • EMI radiated immunity: 100 V/m from 200 MHz to 1000 MHz per ISO11452-2 • EMI conducted immunity: <ul style="list-style-type: none"> - low voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 200 MHz - high voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 400 MHz • EMC: exceeds CE requirements 	<ul style="list-style-type: none"> • EMI radiated immunity: 100 V/m from 200 MHz to 1000 MHz per ISO11452-2 • EMI conducted immunity: <ul style="list-style-type: none"> - low voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 200 MHz - high voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 400 MHz • EMC: exceeds CE requirements
Life	35 M cycles	infinite
Sealing	IP69K	IP69K
Operating temperature range	-40°C to 125°C [40°F to 257°F]	-40°C to 125°C [40°F to 257°F]
Dimensions	55 mm L x 43 mm W x 41 mm H [2.17 in L x 1.69 in W x 1.61 in H]	59,6 mm L x 43,3 mm W x 17,8 mm H [2.35 in L x 1.70 in W x 0.70 in H]
Features	magnetically biased, Hall-effect IC senses rotary movement of the actuator over a set operating range; activated by integral shaft (available with or without lever)	magnetically biased, Hall-effect IC senses rotary movement of the actuator over a set operating range; activated by a separate magnet (available bare or housed)

PRESSURE & VACUUM SWITCHES

Feature set points ranging from 0.5 psi to 4500 psi and 1.1 in-Hg to 22 in-Hg, and enhanced repeatability of set points and wide media capability. IP67 environmental sealing and high proof pressure and burst pressure ratings allow for use in many rugged applications that require the making or breaking of an electrical connection in response to a pressure change.



SERIES	HP	MH	ME	LP	LE	1000	5000 VACUUM
Type	high pressure	medium pressure	medium pressure	low pressure	low pressure	hydraulic brake pressure switch	direct action blade contact
Set point range	100 psi to 4500 psi	40 psi to 500 psi	25 psi to 350 psi	3.5 psi to 150 psi	3.5 psi to 150 psi	20 psi ±10 psi [1,37 bar ±0,69 bar]	factory set: 1.1 inHg to 22 inHg
Contacts	silver / gold inlay	gold plated	gold plated	gold plated	gold plated	silver-plated copper	silver-plated copper
Vacuum	-	-	-	-	-	-	1.1 in-Hg to 22 in-Hg
Oper. pressure	5000 psi	600 psi	500 psi	250 psi	250 psi	1400 psi	30 in-Hg max.
Proof pressure	10000 psi (base style A) 6500 psi (base style B)	6000 psi	4000 psi	500 psi	500 psi	2973 psi	-
Burst pressure	20000 psi (base style A) 9000 psi (base style B)	9000 psi	8000 psi	1250 psi	1250 psi	3500 psi	150 psi
Smart diagnostic technology	yes	no	yes	yes	yes	no	no
Hysteresis	5 % to 55 % (based on set point range)	-	-	5 % to 55 % (based on set point range)	-	-	-
Sealing	IP67 (connectors) IP67 (wire/Base A) IP69K (wire/Base B) IP00 (blade/screw)	IP67 (connectors) IP00 (blade/screw)	IP67 (connectors) IP67 (wire out) IP00 (blade/screw)	IP67 (connectors) IP67 (wire out) IP00 (blade/screw)	IP67 (connectors) IP67 (wire out) IP00 (blade/screw)	IP00	IP65
Connector	M14 × 1.5, M18 × 1.5, 1/2-20 UNF, 9/16-18 UNF, 3/4-16 UNF, 7/8-14 UNF	1/4-18 NPT, 1/8-27 NPT, 1/2-20 UNF, 1/8-27 PTF, M12 × 1.5, M14 × 1.5, 9/16-18 UNF, 3/4-16 UNF, G1/8 BSPP, 3/8-24 UNF, 7/16-20 UNF, 1/2-14 NPT, R1/8 BSPT, M10 × 1.0, R1/2 BSPT, G1/4 BSPP, R1/4 BSPT	1/4-18 NPT, 1/8-27 NPT, 1/2-20 UNF, 1/8-27 PTF, M12 × 1.5, M14 × 1.5, 9/16-18 UNF, 3/4-16 UNF, G1/8 BSPP, 7/16-20 UNF, R1/8 BSPT, M10 × 1.0, R1/2 BSPT, G1/4 BSPP, R1/4 BSPT	1/4-18 NPT, 1/8-27 NPT, 1/2-20 UNF, 1/8-27 PTF, M12 × 1.5, M14 × 1.5, 9/16-18 UNF, 3/4-16 UNF, G1/8 BSPP, M18 × 1.5, 7/16-20 UNF, R1/8 BSPT, M10 × 1.0, R1/2 BSPT, G1/4 BSPP, R1/4 BSPT	1/4-18 NPT, 1/8-27 NPT, 1/2-20 UNF, 1/8-27 PTF, M12 × 1.5, M14 × 1.5, 9/16-18 UNF, 3/4-16 UNF, G1/8 BSPP, M18 × 1.5, 7/16-20 UNF, R1/8 BSPT, M10 × 1.0, R1/2 BSPT, G1/4 BSPP, R1/4 BSPT	M10 × 1.25 banjo fitting (single or double); M10 × 1; 1/8-27 NPT	1/8-27 NPT male thread standard (others, including metric, available)
Terminals	spade terminals, screw terminals, cable, Deutsch DT04-3P, AMP Superseal 1.5, cable with Deutsch DT04-3P, cable with Deutsch DT04-2P, cable with AMP Superseal 1.5, cable with Packard Metripak 150, cable with DIN 4365D-C, cable with M12 × 1, 150 mm cable with Packard weatherpack male terminal	spade terminals, screw terminals, Amp Super Seal, cable, cable w/Metripak 280 Delphi, cable w/Deutsch, cable w/Packard, cable w/ITT Cannon 2P Sure-Seal, cable w/Amp Super Seal, Deutsch DT04-2P-E005 cable w/AMP 2.5 mm System, cable w/Metripak 150 Delphi	spade terminals, screw terminals, cable, Deutsch DT04-3P, AMP Superseal 1.5, cable with Deutsch DT04-3P, cable with Deutsch DT04-2P, cable with AMP Superseal 1.5, cable with Packard Metripak 150, cable with DIN 4365D-C, cable with M12 × 1, 150 mm cable with Packard weatherpack male terminal	spade terminals, screw terminals, cable, Deutsch DT04-3P, AMP Superseal 1.5, cable with Deutsch DT04-3P, AMP Superseal 1.5, cable with Packard Metripak 150, cable with DIN 4365D-C, cable with M12 × 1, 150 mm cable with Packard weatherpack male terminal	spade terminals, screw terminals, cable, Deutsch DT04-3P, AMP Superseal 1.5, cable with Deutsch DT04-3P, cable with Deutsch DT04-2P, cable with AMP Superseal 1.5, cable with Packard Metripak 150, cable with DIN 4365D-C, cable with M12 × 1, 150 mm cable with Packard weatherpack male terminal	1/4 in blade	#8-32 screws, 1/4 in blade, MetriPak 280
Approvals	CE, UKCA	CE, UKCA	CE, UKCA	CE, UKCA	CE, UKCA	-	-

BOARD-MOUNT PRESSURE SENSORS & HEAVY-DUTY PRESSURE TRANSDUCERS

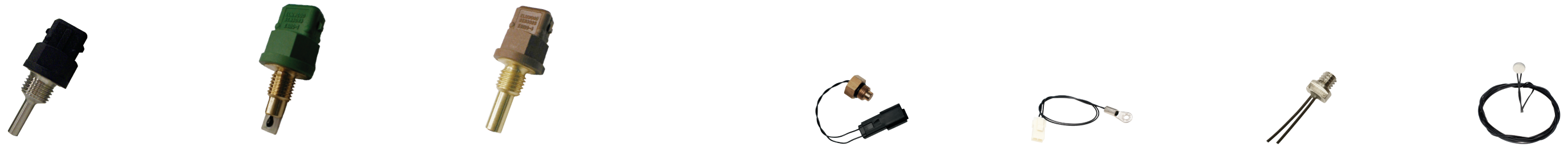
Complete amplified and compensated pressure measurement. With a choice of ports, connectors, outputs and pressure ranges, transducers can be configured. Heavy-duty pressure transducers are engineering to be resistant to aggressive media in most harsh environments.



SERIES	40PC	MLH	PX2	PX3
Pressure port type	o-ring interface	1/4-18 NPT, 1/8-27 NPT, 7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512), 1/2-14 NPT, R 1/4-19 BSPT (ISO 7-1 tapered thread), R 1/8-28 BSPT (ISO 7-1 tapered thread)	7/16-20 UNF 1/4 in 45° Flare Female Schrader (SAE J512), 7/16-20 UNF 45° Flare Male (SAE J513), 7/16-20 UNF 37° Flare Male (SAE J514), G1/4 (ISO 1179-3), G1/8 (ISO 1179-3), M12 x 1.5 (ISO 6149-3), 1/4-18 NPT, 1/8-27 NPT, 9/16-18 UNF, (SAE J1926-3), 7/16-20 UNF (SAE J1926-3)	7/16-20 UNF 1/4 inch 45° Flare Female Schrader (SAE J512), G1/4 (ISO 1179-3), M12 x 1.5 (ISO 6149-3), 1/4-18 NPT, 1/8-27 NPT, brazable tube
Measurement type	gage, bidirectional gage, vacuum gage	gage, sealed gage	absolute, sealed gage, vented gage	absolute, sealed gage
Construction	silicon piezoresistive technology	port: 304L stainless steel; diaphragm: Haynes 214 alloy	port and housing: 304 stainless steel, connector: PBT 30% GF	threaded ports: brass C36000 (lead (Pb) content: 3.7% max.) tube port: copper UNS C12200 (lead (Pb) free)
Pressure range	1 psi to 500 psi	0 psi to 50 psi through 0 psi to 8000 psi	1 bar to 70 bar 100 kPa to 7 MPa 15 psi to 1000 psi	1 bar to 50 bar 15 psi to 700 psi
Output signal	Vdc	ratiometric (from 5 Vdc excitation): 0.5 Vdc to 4.5 Vdc regulated: 1 Vdc to 6 Vdc, 0.25 Vdc to 10.25 Vdc, 0.5 Vdc to 4.5 Vdc, 1 Vdc to 5 Vdc current: 4 mA to 20 mA	ratiometric: 5.0 V, 10 %Vs to 90 %Vs; 5.0 V, 5 %Vs to 95 %Vs; 3.3 V, 10 %Vs to 90 %Vs; 3.3 V, 5 %Vs to 95 %Vs regulated: 1 Vdc to 6 Vdc, 0.25 Vdc to 10.25 Vdc, 0.5 Vdc to 4.5 Vdc, 1 Vdc to 5 Vdc current: 4 mA to 20 mA	ratiometric: 0.5 Vdc to 4.5 Vdc, 0.33 Vdc to 2.97 Vdc
Accuracy	linearity & hysteresis: 0.25 % typ.	±0.25 %FSS (±0.5 %FSS on ranges below 100 psi)	±0.25 %FSS	±0.25 %FSS
Total error band	-	±2 %FSS to ±15 %FSS, depending on temp range and termination type	±2 %FSS at -40°C to 125°C [-40°F to 257°F]	±1.0 %FSS at -20°C to 85°C [-4°F to 185°F] ±2.0 %FSS at <-20°C, >85°C [<-4°F, >185°F]
Amplified	yes	yes	yes	yes
Compensated temperature range	-45°C to 85°C [-49°F to 185°F]	ratiometric output: -40°C to 125°C [-40°F to 257°F]; regulated and 4 mA to 20 mA outputs: -40°C to 125°C [-40°F to 257°F]	-40°C to 125°C [-40°F to 257°F]	-40°C to 125°C [-40°F to 257°F]
Electrical connector type	DIP	Metri-Pack 150, Hirschmann (mates with G4W1F), M12 x 1 (Brad Harrison micro), DIN 43650-C, 8 mm male, AMP Superseal 1.54, Cable (24 AWG, 1 meter), Cable (24 AWG, 3 meter), flying leads (20 AWG, 6 in), Deutsch DTM04-3P (integral)	Metri-Pack 150 (UL 94 HB or V-0 options), Micro M12, DIN, Deutsch, cable harness (1 m, 2 m, 3 m, or 5 m)	Metri-Pack 150 (UL V-0), cable harness (PVC or XLPE)
Measurements (H x W x D)	19,81 mm x 11,18 mm x 30,99 mm [0.78 in x 0.44 in x 1.22 in]	27,0 mm x 27,0 mm x 55 mm [1.06 in x 1.06 in x 2.18 in]	66 mm x 21,5 mm dia. [2.60 in x 0.84 in dia.]	50 mm x 22 mm dia. [2 in x 0.87 in dia.]
Approvals	meets MIL-STD-202 Method 213	UL component recognition for USA/Canada: file no. E258956	IP65 or IP69K, depending on connector	Ingress protection up to IP67, RoHS, REACH, and CE & UKCA compliant

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.



SERIES	R300	ES110	ES120	500	512	526, 535	590
Temp. sensing type	immersion	air/gas	immersion	air/gas, immersion, surface, and liquid level	surface	surface	surface
Thermistor type	RTD	NTC	NTC or KTY	NTC	NTC	NTC	NTC
Nominal resistance at 25°C [77°F]	100 Ohm	2000 Ohm	2000 Ohm	200 Ohm to 1,000,000 Ohm (inclusive)	various	various	various
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]	-40°C to 150°C [-40°F to 302°F]	-40°C to 300°C [-40°F to 572°F] (inclusive)	-60°C to 204°C [-76°F to 399°F]	-60°C to 160°C [-76°F to 320°F]	-60°C to 125°C [-76°F to 257°F]
Housing material	stainless steel	brass	brass	plastic, aluminum, stainless steel, epoxy filled, tin- or nickel-plated copper, ceramic or kynar-filled tubing	aluminum	aluminum or stainless steel	aluminum or stainless steel
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	overmolded connector with M10 x 1.25, M10 x 1.0, M12 x 1.5, M14 x 1.50 thread, or 1/8 PTF	wide variety of connectors, lead types, materials, and insulation	ring tongue #5 with two flying leads	adhesion with two flying leads; bullet housing with two flying leads (termination available)	adhesion with two flying leads; ring tongue (#5, #6, #10) with two flying leads; ring tongue with Molex connector; threaded body with flying leads
Features	enhanced response, reliability, and accuracy; stainless steel construction	exposed thermistor; rugged design; brass encapsulation	enclosed thermistor; rugged design; brass encapsulation	wide selection of housing, resistance, and termination options	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	wide variety of probe assembly styles; choice of custom or existing designs; enhanced sensitivity, accuracy, stability/low drift; RTD linear output available

KEY & ROTARY SWITCHES AND SHIFTERS

Often used on control panels or machinery in harsh environments, Honeywell key and rotary switches use o-rings to help keep dirt and moisture out of the contact chamber and prolong the switch's life. Custom switches and controls are "standard" for Honeywell.



SERIES	INTEGRAL CONN. (KEY)	SCREW TERMINAL (KEY)	ROTARY/KEYLESS SWITCH
Connector	MetriPak 280 and Sumitomo	screw	MetriPak 280, Sumitomo, screw
Electrical ratings (res.)	12 Vdc, 20 A; 24 Vdc, 8 A	12 Vdc, 20 A; 24 Vdc, 10 A; 48 Vdc, 4 A	12 Vdc, 20 A; 24 Vdc, 8 A
Operating temperature	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]
Cycle life at electrical load	25000 cycles	25000 cycles	25000 cycles
Position	2 position (off-on); 3 position (off-on-start), (off-on-start), magnetoground; 4 position (off-on-pre-heat-start)	2 position (off-on); 3 position (off-on-start); 3 position (on-off-on)	3 position (on-off-on), (off-on-start), (off-on-on); 4 position (off-on-acc-start), (off-ignition-ignition heat-start)
Measurements	Ø 1.62 in x 2.95 in L	Ø 1.62 in x 2.85 in L	Ø 1.62 in x 2.95 in L
Features	can be designed to match existing keys; options for up to 300 unique key codes per part number; environmentally sealed; recoil spring allows momentary positions		environmentally sealed; recoil spring allows momentary positions



SERIES	HEAVY-DUTY SHIFTER	HEAVY-DUTY TURN SIGNAL
Column size	38 mm, 45 mm, 55 mm	38 mm, 45 mm, 55 mm
Neutral lock	none, drop-down	-
Speeds	2, 3, 4, and 6	-
Lights	-	turn signal, head lamp switch/dimmer, flash to pass, hazard warning
Wiper speeds	-	1 speed, hi/lo, intermittent
Buttons	horn, wash, drop-down	wash, horn
Connectors	integral Packard, integral Deutsch, wire harness	
Expected life cycle	1 million (rotary); 500000 (shifter handle)	50000 cycles
Oper. temp. range	-40°C to 85°C [-40°F to 185°F] (0 % to 95 % relative humidity)	
Operating volt. range	3 V to 32 V	3 V to 32 V
Solenoid load	2 A @ 12.8 V with arc suppression	2 A @ 12.8 V with arc suppression
Measurements	Ø 65,02 mm x 220,47 mm L [Ø 2.56 in x 8.68 in L]	Ø 65,02 mm x 232,16 mm L [Ø 2.56 in x 9.14 in L]
Features	IP67; turn signals are built to complement the shifter, or mounted as stand alone	

PUSH-PULL E-STOP SWITCHES HOUR METERS

Robust, environmentally sealed, sliding contact switch incorporating two circuits with multiple combinations. eStops are available with five different circuitry options.

Hour meters feature accuracy to $\pm 0.02\%$ with various mounting configurations. Excellent vibration and shock resistance.



SERIES	PUSH-PULL/ESTOP
Connector	screw terminal, pigtail harness with connector (Deutsch)
Position	2NO circuits in push; 2NC circuits in push; 1NO/1NC circuit
Cycle life	25000 cycles (rotary)
Chamber sealing	O-ring (IP67 sealing)
Measurements	$\varnothing 45,21$ mm [$\varnothing 1.78$ in]
Temperature	-40°C to 100°C [-40°F to 212°F]
Electrical rating	12 Vdc to 14 Vdc, 20 A; 24 Vdc, 10 A
Features	UV resistant button for outdoor use; moisture, contamination, and vibration resistant; sliding contacts; momentary switch option; knob available in a variety of colors



SERIES	LM
Type	ac or dc
Counting range	0 to 99,999.9 hours
Sealing	IP67 (front); IP66 (rear)
Voltage range	9 V to 64 V
Accuracy	± 200 ppm/hour
Termination	1/4 in blades; 3/16 in blades
Approvals	UL, CE, UKCA
Mount/panel cutout opening	2-screw & standard: 36,8 mm x 24,1 mm [1.45 in x 0.95 in] round: 50,8 mm [2.0 in] dia. rectangular: 45,0 mm x 22,4 mm [1.77 in x 0.88 in]
Oper. temp.	-40°C to 85°C [-40°F to 185°F]
Number size	7 mm [0.28 in]
Features	backlight and large 7 mm display ease readability; digital, microcontrol unit LCD; durable design of mounting assembly

MICRO SWITCH SEALED TOGGLE SWITCHES

Hermetic and environmentally sealed toggle switches offer enhanced reliability with MICRO SWITCH technology. Can be used in a variety of applications where a panel-mount switch with an environment-proof rating is needed, including industrial equipment, military and commercial aviation, and agriculture.



	NT	TL
Type	industrial-grade toggle	military-grade toggle
Sealing	IP67/68; NEMA 3, 3R, 4 and 13	qualified to MIL-DTL-3950
Operating temp.	-40°C to 71°C [-40°F to 160°F]	-65°C to 71°C [-85°F to 160°F]
Actuator/lever	standard, locking, special design, tab	standard, special design, tab, paddle, none
Action	2- or 3-position, momentary & maintained	2- or 3-position, momentary & maintained
Mounting	15/32 in bushing	15/32 in bushing
Termination	solder, screw, quick connect	IWTS, solder, screw, quick connect, leadwire
Circuitry	SPST, SPDT, DPST, DPDT, 4PST, 4PDT	SPST, SPDT, DPST, DPDT, 3PST, 3PDT, 4PST, 4PDT
Contacts	silver alloy	silver alloy, gold-plated
Amp rating	up to 20 A (resistive)	up to 20 A (resistive)
Measurements	58,4 mm H x 33,5 mm W x 22,6 mm D [2.3 in H x 1.32 in W x 0.89 in D]	58,4 mm H x 33,5 mm W x 22,6 mm D [2.3 in H x 1.32 in W x 0.89 in D]
Approvals	UL, CSA, CE, UKCA	UL, CSA, CE, UKCA, qualified to MIL-DTL-3950
Features	completely sealed switching chamber; enhanced tactile feedback	environment-proof sealing; qualified to MIL-DTL-3950

MICRO SWITCH WATER-TIGHT & PREMIUM BASIC SWITCHES

Simple or precision on/off, end of limit, presence/absence, pressure, temperature, and manual operator interface application needs. Water-tight/dust-tight series provide IP67 protection to operate under difficult environmental conditions. Premium series delivers a broad range of ratings, operating actions, and terminations.



	V15W	ZW	ZD	BZ/BA/BM/BE	V7
Type	water-tight	water-tight	water-tight	premium	premium
Amp rating	0.1 A, 5 A, 10 A	0.1 A, 5 A	0.1 A, 3 A	1 A, 5 A, 10 A, 15 A, 20 A, 22 A, 25 A	0.1 A to 25 A
Circuitry	SPDT, SPNO, SPNC	SPDT, SPNO, SPNC	SPDT, SPNO, SPNC	SPDT, SPNO, SPNC	SPDT, SPNO, SPNC
Operating force	15 g, 25 g, 50 g, 100 g, 200 g	1.94 oz to 7.16 oz	130 gf to 195 gf	<1.0 oz to 25 oz <1.0 oz to 28 oz 1.0 oz to 35 oz 2.5 oz to 25 oz	0.7 oz max. to 14.6 oz max.
Terminations	preleaded; terminals: 4,8 mm x 0.8 mm or 4,8 mm x 0.5 mm	quick connect, solder, cable bottom/end, cable side exit	solder, pcb straight, pcb left angle, pcb right angle, pre-wired	quick connect, solder, screw, wire harness with connector	quick connect, pc board, pcb straight angle left
Actuators/levers	pin plunger, straight, roller, sim. roller, special	pin plunger, straight, roller, sim. roller	pin plunger, straight, sim. roller	<ul style="list-style-type: none"> • plunger: pin, high overtravel • panel mount • rigid lever: straight, roller, formed adj. • flexible leaf: straight, roller, formed 	pin plunger, straight, short flag, roller, sim. roller, curved tip, loop, paddle
Voltage	125 Vac, 250 Vac, 30 Vdc, 48 Vdc	125 Vac, 250 Vac	125 Vac, 12 Vdc	125 Vac, 250 Vac, 480 Vac	125 Vac, 250 Vac, 277 Vac
Approvals	UL, cUL, CE, UKCA, ENEC, CQC	UL, cUL, CE, UKCA, ENEC	UL, cUL, CE, UKCA, ENEC	UL, CSA, ENEC, CE, UKCA, FAA-PMA, MIL-PRF-8805 (varies by model)	UL, CSA, CE, UKCA, ENEC
Operating temperature range	-40°C to 85°C [-40°F to 185°F]	-25°C to 80°C [-13°F to 176°F]	-40°C to 85°C [-40°F to 185°F]	-55°C to 85°C [-67°F to 185°F] 121 and 204°C options	-40°C to 150°C [-40°F to 302°F]
Contacts	silver nickel, gold-plated option	silver, gold-plated silver	silver, gold-plated silver	gold, silver, silver-copper-nickel, silver cadmium oxide, silver-tin oxide	silver, silver cadmium oxide, gold
Housing material	PBT polyester thermoplastic	PBT (polyester)	PBT polyester	phenolic: general purpose, heat-resistant, high temperature, mica-filled	PCT polyester thermoplastic
Measurements	15,9 mm H x 10,3 mm W x 33 mm L [0.63 in H x 0.41 in W x 1.3 in L]	9,0 mm H x 6,4 mm W x 19,8 mm L [0.36 in H x 0.25 in W x 0.78 in L]	10,6 mm H x 6,35 mm W x 19,8 mm L [0.42 in H x 0.25 in W x 0.78 in L]	25,4 mm H x 17,5 mm W x 49,3 mm L [1.0 in H x 0.69 in W x 1.94 in L]	15,9 mm H x 10,2 mm W x 28,8 mm L [0.63 in H x 0.4 in W x 1.14 in L]
Features	designed for harsh-duty, wash down areas; high sealing capability with an IP67 rating (pre-leaded only)	IP67 available; low energy or power-duty electrical ratings; gold-plated or silver contacts; PBT polyester housing material	low energy or power-duty electrical ratings; gold-plated or silver contacts; PBT polyester housing material	worldwide standard "large basic" switch; low operating force and travel; extended mechanical life; momentary or maintained actions	extended mechanical and electrical life; custom engineered solutions

MICRO SWITCH MEDIUM-DUTY GLOBAL & HEAVY-DUTY LIMIT SWITCHES

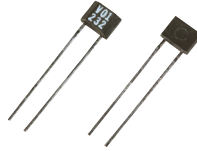
Meet IEC standards for world-wide acceptance – often used in lifts and elevators, electronic assembly, construction and agriculture equipment, material handling, and rail. EN50041 and EN50047 mounting pattern options. Global approvals, support, and sourcing.



	14CE/914CE	91MCE	E6/V6	GLA	GLC	GLD	GLE	HDLS
Housing type	–	–	split housing, side mount; split housing, flange mount	EN 50041	EN 50047 (metal)	EN 50047 (plastic)	EN 50047 compatible	HDLS plug-in and non-plug-in
Sealing	IP65, IP66, IP67; NEMA 1, 3, 4, 6, 6P, 12, 13	IP67; NEMA 1, 4, 12, 13	E6/V6-RQ: IP40; NEMA 1 E6/V6-RN: IP66; NEMA 1, 3, 4	IP67; NEMA 1, 3, 4, 12, 13	IP66/IP67; NEMA 1, 4, 12, 13	IP66/IP67; NEMA 1, 12, 13	IP66; NEMA 1, 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] -40°C [-40°F] low temp (optional)	-25°C to 85°C [-13°F to 185°F]	-32°C to 71°C [-25°F to 160°F] -40°C [-40°F] low temp (optional)	-25°C to 85°C [-13°F to 185°F] side rotary: -40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]	-40°C to 85°C [-40°F to 185°F]	-12°C to 93°C [10°F to 200°F] (standard) -40°C to 121°C [-40°F to 250°F] (low-temp optional)
Housing material	zinc die-cast	zinc die-cast	zinc die-cast	zinc die-cast	zinc die-cast	high-strength thermo-plastic	zinc die-cast	zinc die-cast
Actuators/levers	side rotary, top plunger, roller plunger, pushbutton, wobble	side rotary, top plunger, roller plunger, bushing-mount actuators	top plunger, maint. with reset plunger, wobble, lever actuated	side rotary, top plunger, top roller lever, roller plunger, wobble	side rotary, top plunger, top roller lever, roller plunger, wobble	side rotary, top plunger, top roller, 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	4-pin M12 connector, side exit cable, bottom exit cable	0.5 in - 14NPT (or NPSM) conduit, mini-connector, cable	0.5 in - 14NPT conduit, 20 mm, PG13.5	0.5 in - 14NPT conduit, 20 mm, PG13.5	0.5 in - 14NPT conduit, 20 mm, PG13.5	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	14CE: CE, UKCA, IEC947-5-1, EN60947-5-1 914CE: UL, CE, UKCA, CSA, IEC947-5-1, EN60947-5-1	cULus, CE, UKCA, CCC	UL, CSA	UL, CE, UKCA, CSA, CCC, IEC 947-5-1, EN60947-5-1, UL508	UL, CE, UKCA, CSA, CCC, IEC 947-5-1, EN60947-5-1, UL508	UL, CE, UKCA, CSA, CCC, IEC 947-5-1, EN60947-5-1, UL508, UL746-C	UL, CE, UKCA, CSA, CCC, IEC 947-5-1, EN60947-5-1, UL508	UL, CE, UKCA, CSA, CCC, EN60947-1, EN60947-5-1
Circuitry	SPDT	1NO 1NC DO snap action, 1NC 1NO slow action: BBM	SPDT, DPDT	SPDT snap action DB, SPDT slow action BBM/MBB, DPDT snap action DB, DPDT sequential, DPDT center neutral, 2NO and 2NC	SPDT snap action DB, SPDT slow action BBM/MBB, 1NC/1NO, 2NC/2NO	SPDT snap action DB, SPDT slow action BBM/MBB, 1NC/1NO, 2NC/2NO	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, 2NC 2NO DPDT center neutral
Contacts	silver, gold	silver	silver	silver, gold	silver, gold	silver, gold	silver, gold	silver, gold
Amp rating	5 A (thermal)	10 A (thermal)	10 A, 15 A, 22 A	10 A (thermal)	10 A (thermal)	10 A (thermal)	10 A (thermal)	10 A (thermal)
Measurements (H x W x D)	49 mm x 40 mm x 16 mm [1.93 in x 1.58 in x 0.63 in]	59,8 mm x 30 mm x 16 mm [2.35 in x 1.18 in x 0.63 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]	55 mm x 30,5 mm x 30 mm [2.16 in x 1.20 in x 1.18 in]	55 mm x 30,5 mm x 30 mm [2.16 in x 1.20 in x 1.18 in]	50 mm x 65 mm x 30 mm [2.37 in x 2.56 in x 1.18 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; pre-leaded or various quick-connect terminations; low-temperature available	positive-opening NC contacts; side and bottom exit connection options	rugged electrostatic, epoxy-coated housing; side or flange mount; low temperature options; hermetic seal optional; models in service for more than 60 years	positive-opening NC contacts	positive-opening NC contacts	positive-opening NC contacts	positive-opening NC contacts	wide variety of actuators, circuitry options, and connectivity; rugged and dependable, models in service for over 40 years

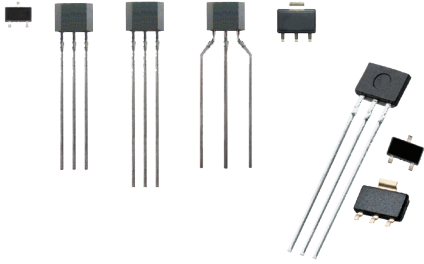
MAGNETO-RESISTIVE SENSOR ICs

With a built-in magnetoresistive bridge integrated on silicon and encapsulated in a plastic package, magnetoresistive sensor ICs feature an integrated circuit that responds to low fields at large distances. Low gauss operation extends sensing distance to one-inch or more, depending on strength of magnetic field.



	2SS52M	VF401	APS00B
Description	omnipolar magnetoresistive digital sensor IC	2-wire MR fine pitch ring magnet sensor IC	high resolution magnetic displacement sensor IC
Magnetic actuation type	omnipolar	differential bridge	analog, saturated mode
Package material and style	2SS52M: plastic radial leads SS522MT: plastic surface mount (SOT-89B)	plastic flat, TO-92-style	plastic surface mount (SOIC-8)
Supply voltage range	3.8 Vdc to 30 Vdc	4.5 Vdc to 16 Vdc	1 Vdc to 12 Vdc
Supply current	11 mA max.	Icc operate: 16.8 mA max. Icc release: 8.4 mA max.	7 mA max.
Output type	digital sinking	digital current source	sin(2θ), cos(2θ)
Operating temperature range	-40°C to 150°C [-40°F to 302°F]	-40°C to 150°C [-40°F to 302°F]	-40°C to 150°C [-40°F to 302°F]
Measurements (H x W)	2SS52M: 4,5 mm x 4,5 mm [0.18 in x 0.18 in] SS522MT: 4,2 mm x 4,5 mm [0.16 in x 0.18 in]	2,8 mm x 2,9 mm [0.11 in x 0.11 in]	4,9 mm x 6,0 mm [0.19 in x 0.24 in]
Features	omnipolar magnetics; sinking output, low gauss operation (25 G max.); operating speed of 0 kHz to over 100 kHz; tape and reel available	wide speed capability; output pattern independent of gap between target and sensor; improved insensitivity to run-out, tilt, and twist; reverse polarity protection	dual analog voltages responding to changes in magnetic field angle; sine and cosine output; accurate to 0,102 mm [0.004 in]; tape and reel available

HALL-EFFECT DIGITAL & LINEAR SENSOR ICs



Honeywell's digital and linear magnetic sensor ICs are constructed from a thin sheet of conductive material. Digital magnetic sensor ICs generate a high or low voltage output in response to a magnetic flux perpendicular to the surface of the sheet. Linear magnetic sensor ICs generate an analog voltage output proportional to the magnetic flux, perpendicular to the surface of the sheet. Quad Hall-elements design minimizes effects of mechanical or thermal stress on output and provide a stable output.

Linear Sensor IC Features

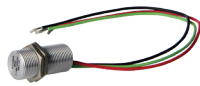
- Package materials and styles include , plastic radial lead, plastic surface pack, ammpack styles T2 and T3, and plastic surface mount (SOT-23, SOT-89B, flat TO-92 style)
- Ratiometric sinking or sourcing output
- Standard mounting centers
- Low-voltage operation
- Tape and reel available

Digital Sensor IC Features

- Bipolar, latching, unipolar, and omnipolar magnetics
- Non-chopper stabilized design, eliminating noise generated by products using this technique
- Package materials and styles include plastic radial lead, plastic surface pack (SOT-23 and SOT-89B)
- High output current and speed capability
- Reverse polarity protection available
- Digital sinking output
- Built-in pull-up resistor option
- Multiple operate/release points available
- Tape and reel available

Back-biased Hall Sensor IC Features

- Ferrous gear speed sensing



SERIES	103SR	4AV19F
Description	Hall-effect digital or linear position sensor	vane-operated, integral magnet, position solid state switch
Package material and style	aluminum threaded barrel	plastic
Magnetic actuation type	unipolar, bipolar, bipolar latching, linear	–
Operation	proximity to external magnet	vane operated
Supply voltage range	digital: 4.5 Vdc to 24 Vdc 4.5 Vdc to 10.5 Vdc	4.5 Vdc to 26.5 Vdc
Supply current	digital: 4 mA to 10 mA (inclusive) linear: 7 mA	5 mA to 18.5 mA
Output type	digital: digital sinking linear: ratiometric sinking/sourcing	current sinking
Operating temp. range	-40°C to 100°C [-40°F to 212°F]	-40°C to 150°C [-40°F to 302°F]
Measurements	Ø 11,9 mm x 25,4 mm H [15/32-2 x 1.0 in H]	15,75 mm W x 13,21 H [0.62 in W x 0.52 in H]
Features	color-coded jacketed cable; adjustable mounting	operated by a low cost, easy to fabricate, ferrous vane interrupter; closely controlled differential to predict pulse width

TEST & MEASUREMENT FOR TRANSPORTATION

Load Cells

- Pedal effort testing
- Seat belt testing
- Tire uniformity machine sensors
- Latch and lock testing
- Manual and automatic shift forces
- Cable testing
- Crimp forces
- Friction/resistance weld quality
- Body mount forces
- Seat tests

Pressure Sensors

- Engine oil pressure
- Coolant pressure
- Fuel pressure
- Cylinder compression
- Pressure decay
- Manifold vacuum
- Fluid flow
- Dry airflow

Wireless Telemetry

- Automotive test stands
- Motor and transmission dynamometers
- Automotive brake testing
- Friction testing

Torque

- Engine and transmission dynamometers
- Power-train testing
- Wheel torque
- Steering torque
- Brake testing
- Pump testing
- Axle testing
- Fastener testing
- Fatigue component testing

LVDTs

- Body panel gauging
- Shaft alignment monitoring
- Valve guide and seat insertion control
- Dimensional gauging/verification
- Press-fitted parts verification
- Electrode dimensional inspection

Accelerometers

- NVH (noise, vehicle, harshness) testing
- Vehicle road testing
- Conditioning monitoring
- Vibration monitoring
- Crash tests
- Preventative maintenance monitoring

When you are designing, testing, and building the latest products for the automotive industry, you need sensors that can stand up to the job... able to perform under harsh and demanding conditions, or in extremely tight spaces, rugged enough to withstand multiple testing runs and provide precise, accurate results over time, every time.

See why more people turn to Honeywell whenever they need sensors for their automotive test and measurement applications.



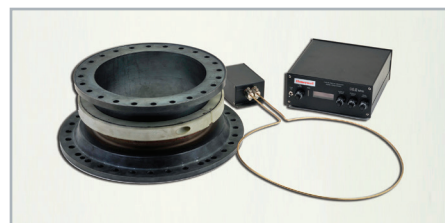
Load Cells



Pressure Sensors



Torque



Wireless Telemetry



Accelerometers



Displacement Transducers

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship during the applicable warranty period. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgment 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 that Honeywell, in its sole discretion, 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.**

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