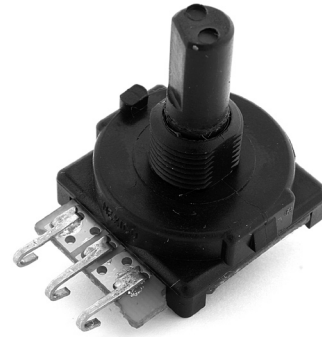


Rotary Position Sensor Line Guide



Select Rotary Position Sensors. Firmly positioned as the leader. The Honeywell Sensing and Control (S&C) Rotary Position Sensor lineup is comprised of encoders, potentiometers, and precision-crafted resolvers.

Our **Encoders** are available in both mechanical and optical versions, and are best for potential applications requiring panel-mounted, manually-operated rotary sensing.

Potentiometer Sensors utilize precision technology developed for potential military applications. Our proprietary conductive plastic offers extensive temperature range and infinite resolution, and is designed to provide precision position measurement.

Resolvers are offered in pancake, brushless, and canned styles. Honeywell S&C is one of a handful of companies offering this highly precise sensor technology. But that's what you'd expect from an industry leader.

FEATURES

ENCODERS

388E Series.

Features: Mechanical encoder • Employs a 2-bit gray code with 16 or 24 positions • Multiple sections (up to six) • Various bushing and shaft sizes • Several mounting styles • Rugged horizontal or vertical mountings with support plates • Nickel-plated brass shaft • Ultrasonic welded, gold-plated terminals for strength.

Benefits: Operates as a compact, dust-free incremental switching device. A positive detent feel, it can be combined with other modular switches that have push-pull, or momentary actions. Often used with local memory to store relative reference data regarding settings for functions in limited-space, panel-mount applications. Potential applications include audio and lighting controls, level control, cursor control, frequency control, temperature control, time control, and position sensing.

510E Series.

Features: Mechanical encoder • Employs 2-bit gray code with up to 36 positions or a 4-bit code • Cost effective • Eliminates need for A/D converters • Stability from -40 °C to 105 °C [-40 °F to 221 °F] • Positive detent feel • Continuous electrical travel • Horizontal and vertical mounting

Benefits: Operates as a cost-effective, high-resolution incremental switching device. The "L" channel leads the "R" channel by 90° electrically in the clockwise position. Often used in limited-space panel-mounted applications where the need for costly, front-panel displays can be completely eliminated. Potential applications include welding/heating equipment, sprinkler systems, manual controls, level control, cursor control, frequency control, temperature control, time control, and position sensing.

600 Series.

Features: Optical encoder • Dual quadrature output generating 128 pulses per channel • Cost effective • Eliminates need for A/D converters • Stability from -40 °C to 65 °C [-40 °F to 149 °F] • Cable and printed circuit terminations available • Stainless steel shaft • Nickel-plated bushing • PC terminals and cable leads available • Outputs are TTL compatible

Benefits: Enhanced life, no contact device capable of approximately 10 million revolutions. Outputs two square waves in quadrature at a rate of 128 pulses per channel per revolution as a standard with other resolutions down to 60 pulses available. Potential applications include robotics, welding/heating equipment, manual controls, motion sensing and control, motor and flow control, low-to-high input for test and measurement, medical and instrumentation, and computer peripherals.

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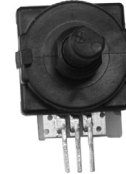
Quality. Reliability. Enhanced life. Global reach.

Honeywell S&C rotary position sensors deliver the features you need and quality you demand. Even better, we offer worldwide support and manufacturing.

Encoders: Our mechanical encoders have 2-bit and 4-bit graycode outputs for absolute electrical reference applications. Manually operated optical encoders output two square waves in quadrature. Various resolutions, PC terminals, or cable leads are available.

Potentiometers: The Honeywell S&C lineup is legendary in military and aerospace industries for reliability, durability, and enhanced life. Our potentiometer designs allow customization to your specs and cost requirements without sacrificing reliability and accuracy. Measuring linear, rotary position, or displacement, these units easily withstand exposure to harsh chemicals and high temperatures.

Resolvers: These non-contact, enhanced precision rotary position sensors are available in standard styles and are fully customizable, offering remarkable specs for impressive performance.



Encoders	388E Series	510E Series	600 Series
Type	mechanical	mechanical	optical
Pulse per revolution	6, 4	16, 9, 6, 4	128
Output	2-bit grey code	2- or 4-bit grey code	quadrature square wave
Dome switch	yes	no	no
Expected rotational life	100K cycles	100K cycles	10 million revolutions
Operating speed	30 rpm max.	50 rpm max.	300 rpm max.
Terminals	PCB pins	PCB pins	PCB pins or cable with/without connector



Cermet and Wirewound Pots	309/409 Series	389 Series	43/RA20 Series
Type	309: compact modular house 409: sealed for board washing	multiple sections available	RA20 meets MIL-R-19
Expected rotational life	25K cycles	25K cycles	10K cycles
Element type	cermet	cermet	wirewound
Power rating	1 W	1 W	2 W
Terminal type	PC, solder hook	PC, solder hook	solder lug
Resistance range	100 Ohm to 5 mOhm	linear: 5 Ohm to 5 mOhm; tapered: 100 Ohm to 2 mOhm	43: 10 Ohm to 50 kOhm RA20: 50 Ohm to 15 kOhm
Bushing type	standard	standard	standard, locking
Potentiometer type	industrial	industrial	industrial
Electrical taper	linear, tapered	linear, tapered	linear



Cermet and Wirewound Pots

58/RA30 Series

591 Series

73 Series

Type	RA30 meets MIL-R-19	multiple sections available	10-turn construction
Expected rotational life	25K cycles	25K cycles	50K cycles
Element type	wirewound	cermet	wirewound
Power rating	4 W	1 W	2 W
Terminal type	solder lug	PC, solder hook	solder lug
Resistance range	58: 50 Ohm to 50 kOhm RA30: 25 Ohm to 25 kOhm	500 Ohm to 100 kOhm	100 Ohm to 100 kOhm
Bushing type	standard, locking	standard	standard
Potentiometer type	industrial	commercial	precision
Electrical taper	linear	linear	linear



Conductive Plastic Pots

308/408 Series

380/53/RV4 Series

381 Series

Type	308: compact modular house 408: sealed for board washing	RV4 meets MIL-PRF-94	metal case and nickel-plated shaft
Expected rotational life	50K cycles	100K cycles, 25K cycles	25K cycles
Element type	conductive plastic	conductive plastic	conductive plastic
Power rating	0.5 W	2 W	1 W
Terminal type	PC, solder hook	solder lug	solder lug
Resistance range	308: 100 Ohm to 1 mOhm 408: 500 Ohm to 10 kOhm	100 Ohm to 1 mOhm 500 Ohm to 10 kOhm	100 Ohm to 5 mOhm
Bushing type	standard, locking	standard, locking	standard, locking
Potentiometer type	industrial	industrial	industrial
Electrical taper	CW audio, linear	linear, tapered	CW audio, linear

Rotary Position Sensor Line Guide



Conductive Plastic Pots

388 Series

392/RV6 Series

574 Series

Type	multiple sections available	RV6 meets MIL-PRF-94	low mounting profile
Expected rotational life	50K cycles	50K cycles	50K cycles
Element type	conductive plastic	conductive plastic	conductive plastic
Power rating	0.5 W	0.5 W	0.5 W
Terminal type	PC, solder hook	PC, solder hook	PC with bracket
Resistance range	linear: 100 Ohm to 5 mOhm; tapered: 500 Ohm to 2 mOhm	100 Ohm to 5 mOhm	1 kOhm to 100 kOhm
Bushing type	standard	standard	standard
Potentiometer type	industrial	industrial	commercial
Electrical taper	linear, tapered	linear, tapered	linear



Conductive Plastic Pots

575 Series

578 Series

585 Series

590 Series

Type	thermoplastic panel mount		carbon elements/metal shaft	multiple sections available
Expected rotational life	50K cycles	2.5M cycles	10K cycles	50K cycles
Element type	conductive plastic	conductive plastic	carbon	conductive plastic
Power rating	0.5 W	0.5 W	0.05 W	0.5 W
Terminal type	PC, solder hook	PC	PC	PC, solder hook
Resistance range	1 kOhm to 50 kOhm	1 kOhm to 10 kOhm	1 kOhm to 10 kOhm	100 Ohm to 1 mOhm
Bushing type	standard	standard	standard	standard
Potentiometer type	commercial	precision	commercial	commercial
Electrical taper	linear, tapered	linear	CW audio, linear	linear



Conductive Plastic Pots

MKV Series

SensorCube Series

TH100 Series

	MKV Series	SensorCube Series	TH100 Series
Type		sealed construction	special electrical and mechanical configurations
Expected rotational life	10 million cycles	10 million cycles	1 million cycles
Element type	conductive plastic	conductive plastic	conductive plastic
Power rating	1 W	1 W	0.5 W
Terminal type	turret	turret	three 20 AWG, 152,4 mm [6.0 in] leads
Resistance range	500 Ohm to 20 kOhm	1 kOhm to 10 kOhm	10000 ohms (total resistance)
Bushing type	no bushing, standard	standard	slotted rotor
Potentiometer type	precision	precision	position transducer
Electrical taper	linear	linear	linear



Non-contact, Hall-effect

HRS100 Series

Type	Hall-effect, stainless steel
Supply voltage	5 Vdc \pm 5 %
Output type	analog voltage
Expected rotational life	10 million cycles
Package style	stainless steel shaft and brass bushing
Temperature range	-40 °C to 85 °C [-40 °F to 185 °F]
Supply current	5 mA (max. at 25 °C [77 °F]), exclusive of load
Electrical taper	linear

Rotary Position Sensor Line Guide



Resolvers

	Cased - Brushless Dual Speed Series	Cased - Brushless Single Speed Series	Pancake - Brushless Multi-Speed Series	Pancake - Brushless Dual-Speed Series
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	one-speed and multi-speed resolver and rotary transformer
Size diameter	(1/10 in) 30	(1/10 in) 17	(1/10 in) 38 to 63	(1/10 in) 92
Speed	1&32	–	12	1&64
Accuracy	1&32	1.25 arcmin to 3.50 arcmin	3 arcmin to 30 arcsec (low distortion harmonic)	(multi-speed) 30 arcsec
Features	–	–	redundant winding	full redundancy (duplex)



Resolvers

	Pancake - Dual Speed Series	Pancake - Multi-Speed Series	Pancake - Single Speed Series
Type	one-speed and multiple-speed	multiple pole pairs	one-speed, one-pole pair
Size diameter	(1/10 in) 31 to 130	(1/10 in) 16 to 67	(1/10 in) 24 to 68
Speed	1&8, 1&16, 1&32, 1&36, 2&36, 1&64, 1&128	4, 8, 16, 32, 64	–
Accuracy	(multi-speed) 36 arcsec to 4 arcsec	1 arcmin to 5 arcsec	3 arcmin to 30 arcsec
Features	simple and duplex	simple and duplex	simple and duplex

CERMET AND WIREWOUND POTENTIOMETERS

309/409 Series.

Features: Compact • Modular package • Cermet element • 1 W power rating • Enhanced performance • 409: sealed for board washing • PC and solder-hook terminals

Benefits: Reduced cost potentiometer that offers the temperature stability of a cermet element and a 1 watt power rating in a compact body. Stable over operating temperature. Potential applications include audio consoles, lighting controls, precision joysticks, telecom control systems, manual controls, medical equipment, telecommunications, and marine controls.

389 Series.

Features: Cermet element • 1 W power rating • Small size • Stackable – up to 6 modules • Rotary, push-pull, and momentary options • 1/4 in or 1/8 in diameter shafts • Single, dual-concentric, or trimmer configurations • Wide range shafts, bushings, terminal styles, resistance values, tapers, and tolerances • Special detents available

Benefits: Basic construction suits the series for countless design options; over a billion configurations available. Potential applications include audio and lighting controls.

43/RA20 Series.

Features: Wirewound element • 2 W power rating • RA20 meets MIL-R-19 standards • Rugged metal construction • Nickel-plated brass shaft • Lock-style bushing available • Linear taper

Benefits: Very stable over operating temperature. Potential applications include manual controls, welding, and heating.

58/RA30 Series.

Features: Wirewound element • 4 W power rating • RA30 meets MIL-R-19 standards • Rugged metal construction • Nickel-plated brass shaft • Lock-style bushing available • Linear taper

Benefits: Designed to be stable over operating temperature. Potential applications include manual controls, welding, and heating.

591 Series.

Features: Compact size • Cermet element • 1 W power rating • Temperature stability • Linear taper • PC terminals • Brass shaft and bushing • Linear taper

Benefits: Reduced cost potentiometer with the benefits of a cermet element. Designed to be stable over operating temperature. Potential applications include manual controls, welding and heating, telecommunications.

73 Series.

Features: Wirewound element • 2 W power rating • 10-turn construction • Nickel-plated brass shaft and bushings • Linear taper

Benefits: Precision-type potentiometer made with a wirewound element. Offers 10 turns for enhanced resolution and accurate output. Potential applications include manual controls.

CONDUCTIVE PLASTIC POTENTIOMETERS

308/408 Series.

Features: Compact • Modular package • Conductive plastic element • 0.5 W power rating • Nickel-plated brass shaft and bushings • Enhanced performance • 408: sealed for board washing • PC and solder-hook terminals • CW audio and linear tapers available

Benefits: Reduced cost potentiometer that offers 0.5 W power rating in a compact body. Potential applications include manual controls, audio and lighting consoles, medical equipment, precision joysticks, and telecommunications.

380/53/RV4 Series.

Features: Conductive plastic element designed to provide enhanced dynamic noise and enhanced rotational life • 2 W power rating • RV4 meets MIL-PRF-94 standards • 380/53: 2 in L shaft, round • RV4: 0.875 in L shaft, slotted • Solder lug terminals • CW audio and linear tapers available

Benefits: Known as the “quiet ones.” Economical potentiometer with rugged industrial construction. Model 53 is available in special construction that

accepts a rotary switch. Potential applications include manual controls (joysticks, panel dials, throttles), electric vehicles, personal mobility, off-road vehicles, forklifts, welding/heating, and telecommunications.

381 Series.

Features: Conductive plastic element • 1 W power rating • Solder lug terminals • Metal case and nickel-plated brass shaft and bushings • Locking-style bushing, rotary switch, or dual section options available • Linear taper

Benefits: Robust construction in a low-cost industrial package. Potential applications include manual and audio controls, and telecommunications.

388 Series.

Features: Conductive plastic element • 0.5 W power rating • Small size • Stackable – up to 6 modules • Rotary, push-pull, and momentary options • 1/4 in or 1/8 in diameter shafts • Single, dual-concentric, or trimmer configurations • Wide range shafts, bushings, terminal styles, resistance values, tapers, and tolerances • Special detents available

Benefits: Basic construction suits the series for countless design options; over a billion configurations available. Potential applications include audio and lighting controls, precision joysticks, and telecom control systems.

392/RV6 Series.

Features: Compact size • Conductive plastic element • RV6: Designed to meet MIL-PRF-94 standards, solderability, and washability test requirements • 0.5 W power rating • Nickel-plated shaft and bushings • PC and solder hook terminals • Linear taper

Benefits: Molded housing offers an internal shaft seal for moisture protection. Potential applications include medical equipment, manual controls, audio equipment, and telecommunications.

574 Series.

Features: Conductive plastic element • 0.5 W power rating • Reduced mounting

profile • Quiet electrical output • Vertical mounting with support bracket • PC style mounting • Smooth feel • Robust construction • All plastic construction • Metric bushing • Linear taper

Benefits: Reduced cost commercial potentiometer with the benefits of a conductive plastic element. Potential applications include welding/heating controls, joysticks, and manual controls.

575 Series.

Features: Conductive plastic element • 0.5 W power rating • Reduced mounting profile • Quiet electrical output • Solder hook terminals for panel mounting • Smooth feel • Robust construction • All plastic construction • Linear taper

Benefits: Reduced cost commercial potentiometer with the benefits of a conductive plastic element. Potential applications include welding/heating controls, joysticks, and manual controls.

578 Series.

Features: Conductive plastic element • 0.5 W power rating • Variable resistor technology • Low mounting profile • Quiet electrical output • Precision control • PC terminals • Nickel-plated shaft and bushing • Smooth feel • Robust construction • Linear taper • Central tap version available

Benefits: Precision-type potentiometer with low torque and very linear tapers delivers enhanced control. Potential applications include off-road vehicles, electric vehicles, marine controls, material handling, personal mobility, manual controls, telecommunications, and audio equipment.

585 Series.

Features: Compact size • Carbon element • 0.05 W power rating • Horizontal mount • PC terminals • Metal shaft and bushings • Linear taper

Benefits: Designed to be used as a low-wattage component that can be panel mounted or PC mounted. Robust construction in a low-cost commercial package, using carbon composition elements. Potential applications include

manual and audio controls, heating equipment, and telecommunications.

590 Series.

Features: Compact size • Conductive plastic element • 0.5 W power rating • Linear taper • PC terminals • Brass shaft and bushing • Linear taper

Benefits: Reduced cost potentiometer with the benefits of a conductive plastic element. Potential applications include manual controls, lighting and audio consoles, precision joysticks, welding and heating, and telecommunications.

MKV Series.

Features: Conductive plastic element • Linearity (accuracy) 0.5 % or less • 1 W power rating • Servo and bushing mounting • Custom electrical travels

Benefits: A cost-effective way of obtaining enhanced accuracy and enhanced life position feedback. Potential applications include valve position feedback, panel control, instrumentation, and missile fin feedback position.

SensorCube Series.

Features: Conductive plastic element • Linearity (accuracy) 2 % or less • 1 W power rating • Sealed construction • Custom electrical travels

Benefits: Cost-effective potentiometer with sealed construction. Enhanced accuracy and reliability. Potential applications include valve position feedback, panel control, instrumentation, and off-road equipment.

TH100 Series.

Features: Conductive plastic element • Fully sealed construction • Enhanced rotational torque • Variable resistor technology • 0.5 W power rating • Special electrical and mechanical configurations, including dual tracks and D-shaped rotor holes available • Linear taper

Benefits: Enhanced performance rotary position transducer that works well in potential angle-management applications such as control-lever sensing and equipment position feedback. Potential applications also include off-road vehicles,

electric vehicles, marine controls, material handling, and personal mobility.

NON-CONTACT, HALL-EFFECT POSITION TRANSDUCERS HRS100 Series.

Features: Solid-state, Hall-effect technology • 90° mechanical rotation • Maximum ESD sensitivity of ± 7 kV • Slotted shaft

Benefits: Use of magnetically coupled information in place of a mechanical wiper assembly designed to provide an enhanced life and cost-effective solution for harsh environments that include temperature, vibration, dither, moisture, and dirt. Potential applications include throttle/speed position and control, inboard lever control, foot pedal position, steering position, suspension system position, seat and mirror position, tilt position, gimbal position and control, and manipulator arm position.

RESOLVERS

Cased-Brushless Dual Speed Series.

Features: (1/10 in) 30 • 20 arcsec accuracy • Speed: 1&32 • Non-contact measurement for enhanced reliability • 360° sensing range • Multi-speed designs available for enhanced accuracies over reduced ranges • Variety of excitation voltages and frequency • Environmentally sealed and qualified to RTCA DO-160D

Benefits: One-speed and multi-speed resolver and rotary transformer. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Cased-Brushless Single Speed Series.

Features: (1/10 in) 17 • 1.25 arcmin to 3.5 arcmin accuracy • Non-contact measurement for enhanced reliability • 360° sensing range • Multi-speed designs available for enhanced accuracies over reduced ranges • Variety of excitation voltages and frequency • Environmentally sealed and qualified to RTCA DO-160D

Benefits: One speed, one pole pair resolver and rotary transformer. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Pancake-Brushless Multi-Speed Series.

Features: Redundant winding • (1/10 in) 38 to 63 • 3 arcmin to 30 arcsec accuracy (low-distortion harmonic) • Speed: 12

- Non-contact measurement for enhanced reliability
- 360° sensing range
- Multi-speed designs available for enhanced accuracies over reduced ranges
- Variety of excitation voltages and frequency
- Environmentally sealed and qualified to RTCA DO-160D

Benefits: Multiple pole pairs resolver and rotary transformer. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Pancake-Brushless Dual Speed Series.

Features: Full redundancy (duplex)

- (1/10 in) 92 • 30 arcsec accuracy (multispeed)
- Speed: 1&64
- Non-contact measurement for enhanced reliability

- 360° sensing range
- Multi-speed designs available for enhanced accuracies over reduced ranges
- Variety of excitation voltages and frequency
- Environmentally sealed and qualified to RTCA DO-160D

Benefits: One-speed and multi-speed resolver and rotary transformer. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Pancake-Dual Speed Series.

Features: Simple and duplex • (1/10 in) 31 to 130 • 36 arcsec to 4 arcsec accuracy (multi-speed) • Variety of speeds available: 1&8, 1&16, 1&32, 1&36, 2&36, 1&64, 1&128

- Non-contact measurement for enhanced reliability
- 360° sensing range
- Multi-speed designs available for enhanced accuracies over reduced ranges
- Variety of excitation voltages and frequency
- Environmentally sealed and qualified to RTCA DO-160D

Benefits: One-speed and multiple speed. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Pancake-Multi Speed Series.

Features: Simple and duplex • (1/10 in) 16 to 67 • 1 arcmin to 5 arcsec accuracy

- Variety of speeds available: 4, 8, 16, 32, 64
- Non-contact measurement for enhanced reliability
- 360° sensing range
- Multi-speed designs available for enhanced accuracies over reduced ranges
- Variety of excitation voltages and frequency
- Environmentally sealed and qualified to RTCA DO-160D

Benefits: Multi-pole pairs. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

Pancake-Single Speed Series.

Features: Simple and duplex • (1/10 in) 24 to 68 • 3 arcmin to 30 arcsec accuracy

- Non-contact measurement for enhanced reliability
- 360° sensing range
- Multi-speed designs available for enhanced accuracies over reduced ranges
- Variety of excitation voltages and frequency
- Environmentally sealed and qualified to RTCA DO-160D

Benefits: One-speed, one-pole pair. Potential applications include ATOM – gunners site position (azimuth and elevation), forward looking radar, missile guidance, solar panel position, and antenna position.

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

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

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

For more information about Sensing and Control products, visit www.honeywell.com/sensing or call +1-815-235-6847. Email inquiries to info.sc@honeywell.com

 **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.

 **WARNING**
MISUSE OF DOCUMENTATION

- The information presented in this catalogue 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.

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