

# 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, Hall-effect rotary position sensors, 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.

**Hall-Effect Rotary Position Sensors** are offered in a variety of sensing ranges, supply voltages, and output configurations.

**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

#### 510E Series.

**Features:** Mechanical encoder • Employs 2-bit gray code with up to 36 positions or a 4-bit gray 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 robotics, irrigation controls, audio/visual equipment, and EKG and defibrillation machines.

#### 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. Potential applications include industrial motion sensing and control, motor/flow control, robotics, low-to-high input for test and measurement, robotics, medical equipment and instrumentation, precision joysticks and computer peripherals.

### 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,

# Rotary Position Sensor Line Guide

## 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

### 510E Series

### 600 Series

| Type                     | mechanical            | optical                                            |
|--------------------------|-----------------------|----------------------------------------------------|
| Pulse per revolution     | 16, 9, 6, 4           | 128                                                |
| Output                   | 2- or 4-bit grey code | quadrature square wave                             |
| Temperature range        | no                    | -40 °C to 65 °C [-40 °F to 149 °F]                 |
| Expected rotational life | 100K cycles           | 10 million rotations min.                          |
| Operating speed          | 50 rpm max.           | 300 rpm max.                                       |
| Terminals                | PCB pins              | PC type B-66, PC type C-24, cable, cable/connector |

## Cermet and Wirewound Pots

### 309/409 Series

### 389 Series

### 43/RA20 Series

| Type                     | 309: compact modular house<br>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;<br>tapered: 100 Ohm to 2 mOhm | 43: 10 Ohm to 50 kOhm<br>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

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



## Conductive Plastic Pots

### 308/408 Series

### 380/53/RV4 Series

### 381 Series

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

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## Conductive Plastic Pots

### 388 Series

### 392/RV6 Series

### 574 Series

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



## Conductive Plastic Pots

### 575 Series

### 578 Series

### 585 Series

### 590 Series

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



## Conductive Plastic Pots

### MKV Series

### SensorCube Series

### TH100 Series

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



## Hall-Effect Rotary Position Sensors

### RTY Series

|                                    |                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sensing range</b>               | 50° (±25°), 60° (±30°), 70° (±35°), 90° (±45°), 120° (±60°), 180° (±90°), 270° (±135°), 360° (±180°)                                                                                                                                                                                                                                                                                   |
| <b>Redundant version</b>           | no                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Input voltage</b>               | low voltage: 5 Vdc ±0.5 Vdc<br>high voltage: 10 Vdc to 30 Vdc                                                                                                                                                                                                                                                                                                                          |
| <b>Output</b>                      | low voltage: 0.5 V to 4.5 V ratiometric<br>high voltage: 0.5 V to 4.5 V non-ratiometric                                                                                                                                                                                                                                                                                                |
| <b>Input current</b>               | low voltage: 20 mA max.; during output to ground short, 25 mA max.<br>high voltage: 32 mA max.; during output to ground short, 47 mA max.                                                                                                                                                                                                                                              |
| <b>Operating temperature range</b> | -40 °C to 125 °C [-40 °F to 257 °F]                                                                                                                                                                                                                                                                                                                                                    |
| <b>Connector</b>                   | AMP super seal                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Life</b>                        | 35 M cycles                                                                                                                                                                                                                                                                                                                                                                            |
| <b>EMI/EMC</b>                     | <ul style="list-style-type: none"> <li>EMI radiated immunity: 100 V/m from 200 MHz to 1000 MHz per ISO11452-2</li> <li>EMI conducted immunity: <ul style="list-style-type: none"> <li>low voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 200 MHz</li> <li>high voltage: 100 mA BCI per ISO11452-4 from 1 MHz to 400 MHz</li> </ul> </li> <li>EMC: exceeds CE requirements</li> </ul> |
| <b>Housing material</b>            | PBT plastic                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Dimensions</b>                  | 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]                                                                                                                                                                                                                                                                                                                        |

# Rotary Position Sensor Line Guide



## Hall-Effect Rotary Position Sensors

|                                    | RPN Series                                                                                                               | HRS100 Series                                                                   |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <b>Sensing range</b>               | 50° (±25°), 60° (±30°), 70° (±35°), 90° (±45°), 120° (±60°), 180° (±90°), 270° (±135°), 360° (±180°)                     | 90° ±2°, 180° ±2°                                                               |
| <b>Redundant version</b>           | yes                                                                                                                      | no                                                                              |
| <b>Input voltage</b>               | 5 Vdc, 8 to 30 Vdc, 10 Vdc to 30 Vdc                                                                                     | 5 Vdc ±10%                                                                      |
| <b>Output</b>                      | 0.25 V to 4.75 V, 0.5 V to 4.5 V, 1 V to 9 V, 3 V to 5 V, 4.5 V to 0.5 V, 4.75 V to 0.25 V, 4 mA to 20 mA, 20 mA to 4 mA | 5% to 95% of applied Vdd, approx. (programmable) (output ratiometric to supply) |
| <b>Input current</b>               | 20 mA max.                                                                                                               | 5 mA typ.                                                                       |
| <b>Operating temperature range</b> | -40 °C to 125 °C [-40 °F to 257 °F]                                                                                      | -40 °C to 85 °C [-40 °F to 185 °F]                                              |
| <b>Connector</b>                   | AMP 1-1419168-1, AMP Superseal 282087-1, Deutsch DT04-3P                                                                 | solder lug, flying wire leads                                                   |
| <b>Life</b>                        | 30 M cycles                                                                                                              | 10 M cycles                                                                     |
| <b>EMI/EMC</b>                     | EMC: 200 V/m ISO 11452-3                                                                                                 | EMI: 30 V/m, 10 kHz to 1000 MHz at 3 m                                          |
| <b>Housing material</b>            | PA66 plastic                                                                                                             | metal                                                                           |
| <b>Dimensions</b>                  | 63 mm L x 38,8 mm W x 56 mm H<br>[2.48 in L x 1.53 in W x 2.20 in H]                                                     | 32,27 mm [1.3 in] H x 27,79 mm [1.1 in] W                                       |



## Resolvers

|                      | Honeywell Hawk™<br>1-Inch Series            | Cased - Brushless<br>Dual Speed Series                       | Cased - Brushless<br>Single Speed Series                    | Pancake - Brushless<br>Multi-Speed Series              |
|----------------------|---------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------|
| <b>Type</b>          | fully housed                                | one-speed and multi-speed<br>resolver and rotary transformer | one-speed, one-pole pair<br>resolver and rotary transformer | multiple pole pairs resolver<br>and rotary transformer |
| <b>Size diameter</b> | 1.06 in                                     | (1/10 in) 30                                                 | (1/10 in) 17                                                | (1/10 in) 38 to 63                                     |
| <b>Speed</b>         | 1X                                          | 1&32                                                         | —                                                           | 12                                                     |
| <b>Accuracy</b>      | ±7 arcmin                                   | 1&32                                                         | 1.25 arcmin to 3.50 arcmin                                  | 3 arcmin to 30 arcsec (low<br>distortion harmonic)     |
| <b>Features</b>      | transformer (360°+<br>mechanical) redundant | —                                                            | —                                                           | redundant winding                                      |



## Resolvers

|                      | <b>Pancake - Brushless Dual-Speed Series</b>              | <b>Pancake - Dual Speed Series</b>       | <b>Pancake - Mutli-Speed Series</b> | <b>Pancake - Single Speed Series</b> |
|----------------------|-----------------------------------------------------------|------------------------------------------|-------------------------------------|--------------------------------------|
| <b>Type</b>          | one-speed and multi-speed resolver and rotary transformer | one-speed and multiple-speed             | multiple pole pairs                 | one-speed, one-pole pair             |
| <b>Size diameter</b> | (1/10 in) 92                                              | (1/10 in) 31 to 130                      | (1/10 in) 16 to 67                  | (1/10 in) 24 to 68                   |
| <b>Speed</b>         | 1&64                                                      | 1&8, 1&16, 1&32, 1&36, 2&36, 1&64, 1&128 | 4, 8, 16, 32, 64                    | —                                    |
| <b>Accuracy</b>      | (multi-speed) 30 arcsec                                   | (multi-speed) 36 arcsec to 4 arcsec      | 1 arcmin to 5 arcsec                | 3 arcmin to 30 arcsec                |
| <b>Features</b>      | full redundancy (duplex)                                  | simple and duplex                        | simple and duplex                   | simple and duplex                    |

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 RTY Series.

**Features:** 35 M cycle product life  
• Solid-state Hall-effect technology  
• Rugged IP67-sealed package with integral connector • Automotive-grade EMI/EMC testing, integrated reverse polarity, and short circuit • Industry-standard AMP termination, 32 mm mounting pitch, North American and European pinout styles, and compact package • Eight sensing ranges up to 360° • Low voltage and high voltage versions

**Benefits:** Angle monitoring in harsh transportation and industrial applications at a competitive cost. 35 M cycle product life provides long life in the application. Solid-state Hall-effect technology provides non-contact operation, long service

life, low torque actuation and reduces worn-out mechanisms. IP67 sealing and integral connector allows for use in harsh environments. EMI/EMC testing, reverse polarity and short circuit provide protection against installation errors and frequencies in the environment. Industry standard termination, mounting pitch and pinout provide drop-in replacement for existing applications. Choice of sensing ranges provides flexibility in multiple applications, allowing OEMs the range of travel needed for the application. Potential applications include position and movement detection of pedals, throttles, gear shift, levers, steering, linkages, and hitches (trucks, buses, off-road vehicles, industrial/construction/agricultural vehicles and equipment, cranes); suspension displacement/kneeling (buses, trucks); tilt/trim position (boat engines, tilling equipment), as well as industrial valve and HVAC damper control, and irrigation pivot control.

### RPN Series.

**Features:** Solid-state Hall-effect technology • 30 M cycle product life  
• Eight sensing ranges up to 360°  
• Reverse polarity, short circuit and EMC protection • Choice of operating ranges, outputs, and levers • IP67- or IP69K-sealed package with integral connector

**Benefits:** Long service life, low torque actuation, and reduced mechanism wear-out. Enhanced resistance to damage from incorrect wiring and electrical noise. Wide choice of sensing ranges provides range of travel for most applications; tolerant to overtravel. Output choices provide application flexibility. Sealed package with integral connector for durability. Often ideal for detecting position and movement of potential applications such as pedals, throttles, gear shift levers, linkages, suspension and hitches in trucks, offroad vehicles, cranes and construction/agricultural/industrial equipment.

### HRS100 Series.

**Features:** Solid-state Hall-effect technology • 10 M cycle product life (typical) • Two sensing ranges • Choice of termination

**Benefits:** Use of magnetically coupled technology in place of a mechanical wiper assembly provides long life and a cost-effective solution for harsh environments that include temperature, vibration, dither, moisture and dirt. Non-contact operation, long service life, low torque actuation and reduced wear-out of mechanisms. Potential applications include position and movement detection of pedals, throttles, gear shift, levers, steering, linkages, and hitches (off-road vehicles and industrial/construction/agricultural vehicles/equipment), tilt/trim position (boat engines), and industrial material handling equipment (forklifts, robotics)

## RESOLVERS

### Honeywell Hawk™ 1-Inch Series.

**Features:** Non-contact magnetic technology • Fully-housed configuration with bearing/shaft • Small outer diameter of 1 inch • Single speed operation (1 magnetic pole pair) • Excitation voltage range of 2 V to 15 V • Excitation frequency range of 2000 Hz to 5000 Hz • Transformation ratio of 0.45 or 1.0 • Accuracy of  $\pm 7$  arcmin • Operating temperature range of -50.8 °C to 93.3 °C [-60 °F to 200 °F] • 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

**Benefits:** Non-contact magnetic technology eliminates mechanical contact, reducing wear and improving reliability and durability by enhancing operation in harsh environments (performance is not affected by sand, dust or water). Small outer diameter of 1 inch allows for use in size-restricted applications. Single speed operation (1 magnetic pole pair) allows for cost-effective angle resolution over a 360°+ range. Wide voltage range allows customers to standardize on a resolver that meets their excitation voltage needs, simplifying sourcing and delivery, and saving time. Frequency range provides a wide variety of choices with which to power the device. Transformation ratios offer customers two choices, increasing flexibility within the application. Accuracy

enables precise motion control of weapon systems and space positioning devices. Wide operating temperature range allows for use in harsh environments and meets standard military and space application requirements. Product delivery up to 1.5 times faster than many competitive products. Customization due to Honeywell's manufacturing process. Global support due to Honeywell's worldwide presence. Engineering expertise due to Honeywell's 30+ years' experience providing accurate, reliable, and durable resolvers for the aerospace and defense industries. Potential applications include providing absolute position feedback of the azimuth and/or elevation angular planes for military electro-optical systems, fire control systems, gimbals, infrared systems, ordnance delivery and test equipment, as well as satellite, space station, space vehicle solar panel array and antennae positioning for optimum function.

### 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.

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# Notes