

## High Resolution Industrial VRS Magnetic Speed Sensors



### DESCRIPTION

High Resolution VRS sensors are designed for use in applications where precise timing pulse is required, and/or fine pitch gears are used. Proper alignment of the sensor is required.

Passive VRS (Variable Reluctance Speed) Magnetic Speed sensors are simple, rugged devices that do not require an external voltage source for operation.

A permanent magnet in the sensor establishes a fixed magnetic field. The approach and passing of a ferrous metal target near the sensor's pole piece (sensing area) changes the flux of the magnetic field, dynamically changing its strength. This change in magnetic field strength induces a current into a coil winding which is attached to the output terminals.

### FEATURES

- Self-powered operation
- Direct conversion of actuator speed to output frequency
- Simple installation
- No moving parts
- Designed for use over a wide range of speeds
- Adaptable to a wide variety of configurations
- Customized VRS products for unique speed sensing applications
- Housing diameters: 5/8 in (M16) 3/8 in (M12)
- Housing material/style: stainless steel threaded
- Terminations: MS3106 connector, preleaded
- Output voltages: 17 Vp-p to 170 Vp-p

The output signal of a VRS sensor is an ac voltage that varies in amplitude and wave frequency as the speed of the monitored device changes, and is usually expressed in peak to peak voltage (Vp-p).

One complete waveform (cycle) occurs as each target passes the sensor's pole piece. If a standard gear were used as a target, this output signal would resemble a sine wave if viewed on an oscilloscope.

Honeywell also offers VRS sensors for general purpose, high output, power output, high temperature and hazardous location applications, as well as low-cost molded versions.

### POTENTIAL APPLICATIONS

- Engine RPM (revolutions per minute) measurement on aircraft, automobiles, boats, buses, trucks and rail vehicles
- Motor RPM measurement on drills, grinders, lathes and automatic screw machines
- Motor RPM measurement on precision camera, tape recording and motion picture equipment
- Process speed measurement on food, textile, paper, woodworking, printing, tobacco and pharmaceutical industry machinery
- Motor speed measurement of electrical generating equipment
- Speed measurement of pumps, blowers, mixers, exhaust and ventilating fans
- Flow measurement on turbine meters
- Wheel-slip measurement on autos and locomotives
- Gear speed measurement

# High Resolution

## 5/8 INCH (M16\*) SENSORS (All dimensions for reference only. mm/[in])

\*Contact Honeywell for availability of metric mounting thread versions.

### General Specifications

| Parameter               | Characteristic                         | Parameter                | Characteristic                   |
|-------------------------|--|--------------------------|----------------------------------|
| Min. output voltage     | 34 Vp-p                                | Inductance               | 25 mH max.                       |
| Coil resistance         | 45 Ohm to 85 Ohm                       | Gear pitch range         | 36 DP (module 0.7)<br>or coarser |
| Chisel pole piece width | 2,54 mm [0.010 in]                     | Optimum actuator         | N/A                              |
| Min. surface speed      | 0,50 m/s [20 in/s] typ.                | Max. operating frequency | 50 kHz typ.                      |
| Operating temp. range   | -55 °C to 120 °C<br>[-67 °F to 250 °F] | Vibration                | Mil-Std 202F<br>Method 204D      |
| Mounting thread         | 5/8-18 UNF-2A                          | Termination              | MS3106 connector                 |

### Test Condition Specifications

| Parameter       | Characteristic         |
|-----------------|------------------------|
| Surface speed   | 25 m/s<br>[1000 in/s]  |
| Gear            | 8 DP<br>(module 3.17)  |
| Air gap         | 0,127 mm<br>[0.005 in] |
| Load resistance | 1.25 kOhm              |

| Catalog Listing | Weight        | Diagram |  |
|-----------------|---------------|---------|--|
| 3009AN          | 70 g [2.5 oz] |         |  |

### General Specifications

| Parameter               | Characteristic                         | Parameter                | Characteristic                   |
|-------------------------|--|--------------------------|----------------------------------|
| Min. output voltage     | 170 Vp-p                               | Inductance               | 450 mH max.                      |
| Coil resistance         | 910 Ohm to 1200 Ohm                    | Gear pitch range         | 36 DP (module 0.7)<br>or coarser |
| Chisel pole piece width | 2,54 mm [0.010 in]                     | Optimum actuator         | N/A                              |
| Min. surface speed      | 0,25 m/s [10 in/s] typ.                | Max. operating frequency | 15 kHz typ.                      |
| Operating temp. range   | -55 °C to 120 °C<br>[-67 °F to 250 °F] | Vibration                | Mil-Std 202F<br>Method 204D      |
| Mounting thread         | 5/8-18 UNF-2A                          | Termination              | MS3106 connector                 |

### Test Condition Specifications

| Parameter       | Characteristic         |
|-----------------|------------------------|
| Surface speed   | 25 m/s<br>[1000 in/s]  |
| Gear            | 8 DP<br>(module 3.17)  |
| Air gap         | 0,127 mm<br>[0.005 in] |
| Load resistance | 1.25 kOhm              |

| Catalog Listing | Weight        | Diagram |  |
|-----------------|---------------|---------|--|
| 3029AN          | 70 g [2.5 oz] |         |  |

# Industrial VRS Magnetic Speed Sensors

## 5/8 INCH (M16\*) SENSORS CONTINUED (All dimensions for reference only. mm/[in])

\*Contact Honeywell for availability of metric mounting thread versions.

### General Specifications

| Parameter               | Characteristic                      | Parameter                | Characteristic                |
|-------------------------|-------------------------------------|--------------------------|-------------------------------|
| Min. output voltage     | 40 Vp-p                             | Inductance               | 85 mH max.                    |
| Coil resistance         | 120 Ohm to 162 Ohm                  | Gear pitch range         | 36 DP (module 0.7) or coarser |
| Chisel pole piece width | 2,54 mm [0.010 in]                  | Optimum actuator         | N/A                           |
| Min. surface speed      | 0,38 m/s [15 in/s] typ.             | Max. operating frequency | 40 kHz typ.                   |
| Operating temp. range   | -55 °C to 120 °C [-67 °F to 250 °F] | Vibration                | Mil-Std 202F Method 204D      |
| Mounting thread         | 5/8-18 UNF-2A                       | Termination              | MS3106 connector              |

### Test Condition Specifications

| Parameter       | Characteristic      |
|-----------------|---------------------|
| Surface speed   | 25 m/s [1000 in/s]  |
| Gear            | 8 DP (module 3.17)  |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 1.25 kOhm           |

| Catalog Listing | Weight        |  |
|-----------------|---------------|--|
| 3039AN          | 70 g [2.5 oz] |  |

### General Specifications

| Parameter               | Characteristic                      | Parameter                | Characteristic                         |
|-------------------------|-------------------------------------|--------------------------|--|
| Min. output voltage     | 80 Vp-p                             | Inductance               | 25 mH max.                             |
| Coil resistance         | 45 Ohm to 85 Ohm                    | Gear pitch range         | 24 DP (module 1.06) ferrous metal gear |
| Chisel pole piece width | 1,14 mm [0.045 in]                  | Optimum actuator         | N/A                                    |
| Min. surface speed      | 0,50 m/s [20 in/s] typ.             | Max. operating frequency | 50 kHz typ.                            |
| Operating temp. range   | -55 °C to 120 °C [-67 °F to 250 °F] | Vibration                | Mil-Std 202F Method 204D               |
| Mounting thread         | 5/8-18 UNF-2A                       | Termination              | MS3106 connector                       |

### Test Condition Specifications

| Parameter       | Characteristic      |
|-----------------|---------------------|
| Surface speed   | 25 m/s [1000 in/s]  |
| Gear            | 8 DP (module 3.17)  |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 1.25 kOhm           |

| Catalog Listing | Weight        |  |
|-----------------|---------------|--|
| 3044A           | 70 g [2.5 oz] |  |

# High Resolution

## 5/8 INCH (M16\*) SENSORS CONTINUED (All dimensions for reference only. mm/[in])

\*Contact Honeywell for availability of metric mounting thread versions.

### General Specifications

| Parameter               | Characteristic                         | Parameter                | Characteristic                            |
|-------------------------|--|--------------------------|---|
| Min. output voltage     | 300 Vp-p                               | Inductance               | 450 mH max.                               |
| Coil resistance         | 910 Ohm to 1200 Ohm                    | Gear pitch range         | 24 DP (module 1.06)<br>ferrous metal gear |
| Chisel pole piece width | 1,14 mm [0.045 in]                     | Optimum actuator         | N/A                                       |
| Min. surface speed      | 0,38 m/s [15 in/s] typ.                | Max. operating frequency | 15 kHz typ.                               |
| Operating temp. range   | -55 °C to 120 °C<br>[-67 °F to 250 °F] | Vibration                | Mil-Std 202F<br>Method 204D               |
| Mounting thread         | 5/8-18 UNF-2A                          | Termination              | MS3106 connector                          |

### Test Condition Specifications

| Parameter       | Characteristic         |
|-----------------|------------------------|
| Surface speed   | 25 m/s<br>[1000 in/s]  |
| Gear            | 8 DP<br>(module 3.17)  |
| Air gap         | 0,127 mm<br>[0.005 in] |
| Load resistance | 1.25 kOhm              |

| Catalog Listing | Weight        | Diagram |  |
|-----------------|---------------|---------|--|
| 3045A           | 70 g [2.5 oz] |         |  |

### General Specifications

| Parameter               | Characteristic                         | Parameter                | Characteristic                            |
|-------------------------|--|--------------------------|---|
| Min. output voltage     | 65 Vp-p                                | Inductance               | 85 mH max.                                |
| Coil resistance         | 120 Ohm to 162 Ohm                     | Gear pitch range         | 24 DP (module 1.06)<br>ferrous metal gear |
| Chisel pole piece width | 1,14 mm [0.045 in]                     | Optimum actuator         | N/A                                       |
| Min. surface speed      | 0,38 m/s [15 in/s] typ.                | Max. operating frequency | 40 kHz typ.                               |
| Operating temp. range   | -55 °C to 120 °C<br>[-67 °F to 250 °F] | Vibration                | Mil-Std 202F<br>Method 204D               |
| Mounting thread         | 5/8-18UNF-2A                           | Termination              | MS3106 connector                          |

### Test Condition Specifications

| Parameter       | Characteristic         |
|-----------------|------------------------|
| Surface speed   | 25 m/s<br>[1000 in/s]  |
| Gear            | 8 DP<br>(module 3.17)  |
| Air gap         | 0,127 mm<br>[0.005 in] |
| Load resistance | 1.25 kOhm              |

| Catalog Listing | Weight        | Diagram |  |
|-----------------|---------------|---------|--|
| 3046A           | 70 g [2.5 oz] |         |  |

# Industrial VRS Magnetic Speed Sensors

## 3/8 INCH (M12\*) SENSORS (All dimensions for reference only. mm/[in])

\*Contact Honeywell for availability of metric mounting thread versions.

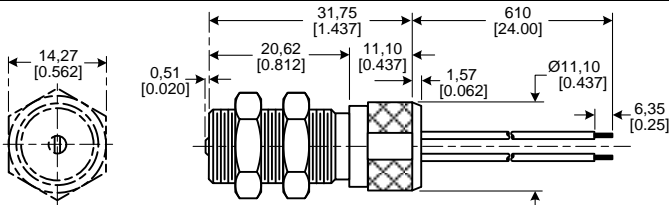
### LOW RESISTANCE COILS FOR HIGH FREQUENCY APPLICATIONS

#### General Specifications

| Parameter               | Characteristic                      | Parameter                | Characteristic                 |
|-------------------------|-------------------------------------|--------------------------|--------------------------------|
| Min. output voltage     | 17 Vp-p                             | Inductance               | 15 mH max.                     |
| Coil resistance         | 45 Ohm to 65 Ohm                    | Gear pitch range         | 36 DP (module 0.70) or coarser |
| Chisel pole piece width | 0,25 mm [0.010 in]                  | Optimum actuator         | 32 DP (module 0.80)            |
| Min. surface speed      | 0,75 m/s [30 in/s] typ.             | Max. operating frequency | 60 kHz typ.                    |
| Operating temp. range   | -40 °C to 107 °C [-40 °F to 225 °F] | Vibration                | Mil-Std 202F Method 204D       |
| Mounting thread         | 3/8-24 UNF-2A                       | Termination              | 24 AWG PVC-insulated leads     |

#### Test Condition Specifications

| Parameter       | Characteristic      |
|-----------------|---------------------|
| Surface speed   | 25 m/s [1000 in/s]  |
| Gear            | 20 DP (module 1.27) |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 100 kOhm            |

| Catalog Listing | Weight        |   |
|-----------------|---------------|---|
| 3014A           | 28 g [1.0 oz] |  |

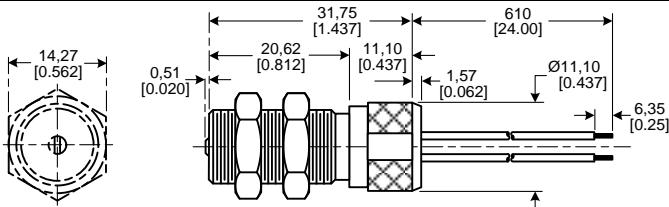
### HIGH RESISTANCE COILS FOR HIGH FREQUENCY APPLICATIONS

#### General Specifications

| Parameter               | Characteristic                      | Parameter                | Characteristic                 |
|-------------------------|-------------------------------------|--------------------------|--------------------------------|
| Min. output voltage     | 55 Vp-p                             | Inductance               | 75 mH max.                     |
| Coil resistance         | 275 Ohm to 330 Ohm                  | Gear pitch range         | 32 DP (module 0.80) or coarser |
| Chisel pole piece width | 0,25 mm [0.010 in]                  | Optimum actuator         | N/A                            |
| Min. surface speed      | 0,38 m/s [15 in/s] typ.             | Max. operating frequency | 40 kHz typ.                    |
| Operating temp. range   | -40 °C to 107 °C [-40 °F to 225 °F] | Vibration                | Mil-Std 202F Method 204D       |
| Mounting thread         | 3/8-24 UNF-2A                       | Termination              | 24 AWG PVC-insulated Leads     |

#### Test Condition Specifications

| Parameter       | Characteristic      |
|-----------------|---------------------|
| Surface speed   | 25 m/s [1000 in/s]  |
| Gear            | 20 DP (module 1.27) |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 100 kOhm            |

| Catalog Listing | Weight        |  |
|-----------------|---------------|--|
| 3024A           | 28 g [1.0 oz] |  |

**⚠ 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.**

**WARRANTY/REMEDY**

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

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

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

**⚠ WARNING**

**MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- 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.**

**SALES AND SERVICE**

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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