

## High Output Industrial VRS Magnetic Speed Sensors



### DESCRIPTION

High Output VRS sensors are designed for use in applications where higher output voltages are needed. They perform best at low to medium speeds with medium to high impedance loads. Front-End Sealed versions are available for use where the sensor is exposed to fluids, lubricants or adverse environmental conditions.

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 lines 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 materials/styles: stainless steel threaded or smooth
- Terminations: MS3106 connector, preleaded
- Output voltages: 8 Vp-p to 190 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, power output, high resolution, 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 Output

## 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   | 190 Vp-p                            | Inductance               | 450 mH max.                            |
| Coil resistance       | 910 Ohm to 1200 Ohm                 | Gear pitch range         | 24 DP (module 1.06) or coarser         |
| Pole piece diameter   | 2,69 mm [0.106 in]                  | Optimum actuator         | 20 DP (module 1.27) ferrous metal gear |
| 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 [-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            | 20 DP (module 1.27) |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 100 kOhm            |

| Catalog Listing | Thread Length (A) | Weight         | Diagram |  |
|-----------------|-------------------|----------------|---------|--|
| 3030AN          | 28 mm [1.1 in]    | 70 g [2.5 oz]  |         |  |
| 3030AN25        | 63 mm [2.5 in]    | 84 g [3.0 oz]  |         |  |
| 3030AN30        | 76 mm [3.0 in]    | 84 g [3.0 oz]  |         |  |
| 3030AN40        | 101 mm [4.0 in]   | 98 g [3.5 oz]  |         |  |
| 3030AN50        | 127 mm [5.0 in]   | 128 g [4.5 oz] |         |  |

### General Specifications

| Parameter             | Characteristic                      | Parameter                | Characteristic                         |
|-----------------------|-------------------------------------|--------------------------|--|
| Min. output voltage   | 190 Vp-p                            | Inductance               | 450 mH max.                            |
| Coil resistance       | 910 Ohm to 1200 Ohm                 | Gear pitch range         | 24 DP (module 1.06) or coarser         |
| Pole piece diameter   | 2,69 mm [0.106 in]                  | Optimum actuator         | 20 DP (module 1.27) ferrous metal gear |
| 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 [-67 °F to 250 °F] | Vibration                | Mil-Std 202F Method 204D               |
| Mounting thread       | 5/8-18 UNF-2A                       | Termination              | 20 AWG Teflon-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 | Thread Length (A) | Weight        | Diagram |
|-----------------|-------------------|---------------|---------|
| 3030S20         | 50 mm [2.0 in]    | 70 g [2.5 oz] |         |
| 3030S30         | 76 mm [3.0 in]    | 84 g [3.0 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   | 190 Vp-p                            | Inductance               | 450 mH max.                            |
| Coil resistance       | 910 Ohm to 1200 Ohm                 | Gear pitch range         | 24 DP (module 1.06) or coarser         |
| Pole piece diameter   | 2,69 mm [0.106 in]                  | Optimum actuator         | 20 DP (module 1.27) ferrous metal gear |
| 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 [-67 °F to 250 °F] | Vibration                | Mil-Std 202F Method 204D               |
| Mounting thread       | 5/8-18 UNF-2A                       | Termination              | 20 AWG Teflon-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         |   |
|-----------------|----------------|---|
| 3030H20         | 140 g [5.0 oz] |  |

### General Specifications

| Parameter             | Characteristic                      | Parameter                | Characteristic                         |
|-----------------------|-------------------------------------|--------------------------|--|
| Min. output voltage   | 190 Vp-p                            | Inductance               | 450 mH max.                            |
| Coil resistance       | 910 Ohm to 1200 Ohm                 | Gear pitch range         | 24 DP (module 1.06) or coarser         |
| Pole piece diameter   | 2,69 mm [0.106 in]                  | Optimum actuator         | 20 DP (module 1.27) ferrous metal gear |
| 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 [-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            | 20 DP (module 1.27) |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 100 kOhm            |

| Catalog Listing | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3030A           | 35 mm 1.4 in]     | 70 g [2.5 oz] |  |
| 3030A25         | 63 mm [2.5 in]    | 84 g [3.5 oz] |  |

# High Output

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

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

### HIGH RESISTANCE COILS FOR MAXIMUM OUTPUT VOLTAGE APPLICATIONS

#### General Specifications

| Parameter             | Characteristic                         | Parameter                   | Characteristic                            |
|-----------------------|--|-----------------------------|---|
| Min. output voltage   | 175 Vp-p                               | Inductance                  | 450 mH max.                               |
| Coil resistance       | 910 to 1200 Ohm                        | Gear pitch range            | 24 DP (module 1.06)<br>ferrous metal gear |
| Pole piece diameter   | 2,69 mm [0.106 in]                     | Optimum actuator            | --  |
| Minimum surface speed | 0,25 m/s [10 in/s] typ.                | Maximum operating frequency | 15 kHz typ.                               |
| Operating temp. range | -55 °C to 150 °C<br>[-67 °F to 300 °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            | 20 DP<br>(module 1.27) |
| Air gap         | 0,127 mm<br>[0.005 in] |
| Load resistance | 100 kOhm               |

| Catalog Listing | Thread Length (A) | Weight        | Diagram  |  |
|-----------------|-------------------|---------------|--|--|
| MA230SAN        | 28 mm [1.1 in]    | 70 g [2.0 oz] | <p>Technical drawing showing dimensions: 19,05 [0.750] (pole piece diameter), 28,12 [1.107] (total length), and Ø19,05 [0.750] (mounting hole diameter). A dimension 'A' is indicated for the thread length. A note points to a 'BRAZED THROUGH POLE PIECE'.</p> | <p>Cross-sectional view of the pole piece with dimensions A and B.</p> |
| MA233SAN        | 76 mm [3.0 in]    | 98 g [3.5 oz] |  |  |

# Industrial VRS Magnetic Speed Sensors

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

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

### NOMINAL RESISTANCE COILS FOR LOW IMPEDANCE LOAD APPLICATIONS

#### General Specifications

| Parameter             | Characteristic                         | Parameter                   | Characteristic                            |
|-----------------------|--|-----------------------------|---|
| Min. output voltage   | 60 Vp-p                                | Inductance                  | 85 mH max.                                |
| Coil resistance       | 120 to 162 Ohm                         | Gear pitch range            | 12 DP (module 2.11)<br>ferrous metal gear |
| Pole piece diameter   | 4,39 mm [0.173 in]                     | Optimum actuator            | N/A                                       |
| Minimum surface speed | 0,38 m/s [15 in/s] typ.                | Maximum operating frequency | 40 kHz typ.                               |
| Operating temp. range | -55 °C to 150 °C<br>[-67 °F to 300 °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 | Thread Length (A) | Weight        | Diagram |  |
|-----------------|-------------------|---------------|---------|--|
| MA240SAN        | 28 mm [1.1 in]    | 70 g [2.0 oz] |         |  |
| MA243SAN        | 76 mm [3.0 in]    | 98 g [3.5 oz] |         |  |

# High Output

## 3/8 INCH (M12\*) 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   | 55 Vp-p                             | Inductance                  | 75 mH max.                             |
| Coil resistance       | 275 Ohm to 330 Ohm                  | Gear pitch range            | 26 DP (module 0.98) or coarser         |
| Pole piece diameter   | 2,36 mm [0.093 in]                  | Optimum actuator            | 24 DP (module 1.06) ferrous metal gear |
| Minimum surface speed | 0,38 m/s [15 in/s] typ.             | Maximum 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, vinyl-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 | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3025A           | 20 mm [0.8 in]    | 28 g [1.0 oz] |  |
| 3020A17         | 44 mm [1.7 in]    | 35 g [1.2 oz] |  |
| 3020A35         | 88 mm [3.5 in]    | 42 g [1.5 oz] |  |

| Catalog Listing | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3025S13         | 30 mm [1.2 in]    | 28 g [1.0 oz] |  |

# Industrial VRS Magnetic Speed Sensors

## 3/8 (M12\*) 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   | 55 Vp-p                             | Inductance                  | 75 mH max.                             |
| Coil resistance       | 275 Ohm to 330 Ohm                  | Gear pitch range            | 26 DP (module 0.98) or coarser         |
| Pole piece diameter   | 2,36 mm [0.093 in]                  | Optimum actuator            | 24 DP (module 1.06) ferrous metal gear |
| Minimum surface speed | 0,38 m/s [15 in/s] typ.             | Maximum 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 | Barrel Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3025SS13        | 30 mm [1.2 in]    | 28 g [1.0 oz] |  |
| 3025SS23        | 63 mm [2.5 in]    | 42 g [1.5 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.**

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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.**

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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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# **Honeywell**



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