

## General Purpose Industrial VRS Magnetic Speed Sensors



### DESCRIPTION

General Purpose VRS sensors are designed for use in applications with medium to high speeds or in electrically noisy environments with relatively small air gaps.

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) mm, 1/4 in (M8), 10/32 in
- Housing materials/styles: stainless steel threaded or smooth
- Terminations: MS3106 connector, preleaded
- Output voltages: 8 Vp-p to 40 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 high output, 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

# General Purpose

## 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   | 40 Vp-p                             | Inductance               | 25 mH max.                             |
| Coil resistance       | 45 Ohm to 85 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    | 0,50 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            | 20 DP (module 1.27) |
| Air gap         | 0,127 mm [0.005 in] |
| Load resistance | 100 kOhm            |

| Catalog Listing | Thread Length (A) | Weight         |  |
|-----------------|-------------------|----------------|--|
| 3010AN          | 28 mm [1.1 in]    | 70 g [2.5 oz]  |  |
| 3010AN25        | 63 mm [2.5 in]    | 84 g [3.0 oz]  |  |
| 3010AN30        | 76 mm [3.0 in]    | 84 g [3.0 oz]  |  |
| 3010AN40        | 101 mm [4.0 in]   | 98 g [3.5 oz]  |  |
| 3010AN50        | 127 mm [5.0 in]   | 128 g [4.5 oz] |  |

| Catalog Listing | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3010A           | 35 mm [1.4 in]    | 70 g [2.5 oz] |  |
| 3010A25         | 63 mm [2.5 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   | 40 Vp-p                             | Inductance               | 25 mH max.                             |
| Coil resistance       | 45 Ohm to 85 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    | 0,50 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              | 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         |  |
|-----------------|----------------|--|
| 3010H20         | 140 g [5.0 oz] |  |

| Catalog Listing | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3010S20         | 50 mm [2.0 in]    | 70 g [2.5 oz] |  |
| 3010S30         | 76 mm [3.0 in]    | 84 g [3.0 oz] |  |

# General Purpose

## 3/8 INCH (M12\*) SENSORS

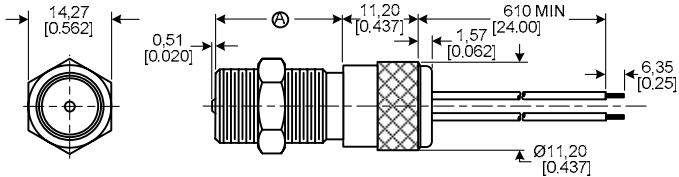
\*Contact Honeywell for availability of metric mounting thread versions.

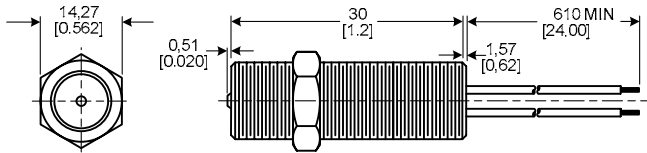
### General Specifications

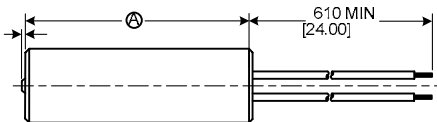
| Parameter             | Characteristic                      | Parameter                | Characteristic                         |
|-----------------------|-------------------------------------|--------------------------|--|
| Min. output voltage   | 20 Vp-p                             | Inductance               | 15 mH max.                             |
| Coil resistance       | 45 Ohm to 65 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 |
| Min. surface speed    | 0,50 m/s [20 in/s] typ.             | Max. operating frequency | 50 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        |   |
|-----------------|-------------------|---------------|---|
| 3015A           | 20 mm [0.8 in]    | 28 g [1.0 oz] |  |
| 3015A17         | 44 mm [1.7 in]    | 35 g [1.2 oz] |   |
| 3015A35         | 88 mm [3.5 in]    | 42 g [1.5 oz] |   |

| Catalog Listing | Weight        |  |
|-----------------|---------------|--|
| 3015S13         | 28 g [1.0 oz] |  |

| Catalog Listing | Thread Length (A) | Weight        |  |
|-----------------|-------------------|---------------|--|
| 3015SS13        | 30 mm [1.2 in]    | 28 g [1.0 oz] |  |
| 3015SS25        | 63 mm [2.5 in]    | 42 g [1.5 oz] |  |

# Industrial VRS Magnetic Speed Sensors

## 1/4 INCH (M8\*) 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   | 12 Vp-p                             | Inductance               | 16 mH max.                             |
| Coil resistance       | 190 Ohm max.                        | Gear pitch range         | 36 DP (module 0.70) or coarser         |
| Pole piece diameter   | 1,00 mm [0.040 in]                  | Optimum actuator         | 28 DP (module 0.90) ferrous metal gear |
| 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       | 1/4-40 UNS-2A                       | Termination              | 30 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        |  |
|-----------------|-------------------|---------------|--|
| 3050            | 15 mm [0.6 in]    | 14 g [0.5 oz] |  |
| 3050A13         | 30 mm [1.2 in]    | 14 g [0.5 oz] |  |
| 3050A20         | 50 mm [2.0 in]    | 14 g [0.5 oz] |  |

| Parameter             | Characteristic                      | Parameter                | Characteristic                         |
|-----------------------|-------------------------------------|--------------------------|--|
| Min. output voltage   | 12 Vp-p                             | Inductance               | 16 mH max.                             |
| Coil resistance       | 190 Ohm max.                        | Gear pitch range         | 36 DP (module 0.70) or coarser         |
| Pole piece diameter   | 1,00 mm [0.040 in]                  | Optimum actuator         | 28 DP (module 0.90) ferrous metal gear |
| 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       | 1/4-40 UNS-2A                       | Termination              | 30 AWG PVC-insulated leads             |

| 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  | Weight        |  |
|-----------------|----------------|---------------|--|
| 3050S10         | 25 mm [1.0 in] | 14 g [0.5 oz] |  |

# General Purpose

## 10/32 INCH SENSORS (All dimensions for reference only. mm/[in])

(No metric available.)

### General Specifications

| Parameter             | Characteristic                      | Parameter                | Characteristic                         |
|-----------------------|-------------------------------------|--------------------------|--|
| Min. output voltage   | 8 Vp-p                              | Inductance               | 14 mH max.                             |
| Coil resistance       | 155 Ohm                             | Gear pitch range         | 32 DP (module 0.80) or coarser         |
| Pole piece diameter   | 1,5 mm [0.062 in]                   | Optimum actuator         | 26 DP (module 0.98) ferrous metal gear |
| 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       | 10-32 UNF-2A                        | Termination              | 32 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  | Weight         |  |
|-----------------|----------------|----------------|--|
| 3080            | 12 mm [0.5 in] | 8,5 g [0.3 oz] |  |

# Industrial VRS Magnetic Speed Sensors

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## **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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