

Magnetic Sensors Line Guide



You know us as a leader, whether you've known us as MICRO SWITCH™ or Honeywell Sensing and Control (S&C). In 1968, we revolutionized the industry with the first solid-state keyboard combining Hall-effect sensing and associated electronics in a single circuit. Today, the Honeywell S&C family of magnetic position sensors includes digital and analog Hall-effect position, magnetoresistive digital, Hall-effect vane, gear-tooth, and Hall-effect basic switches and magnets. These high-speed, extended life sensors are often directly compatible with other electronic

circuits, responding to the presence or the interruption of a magnetic field by producing a proportional output. Gear-tooth and other packaged Hall-effect speed and direction sensors sense movements of a ferrous metal target. Digital and analog “sensor-only” devices are operated by a permanent magnet or electromagnet, while actuation mode depends on the type of magnets used. A vane passing through a gap or a magnet mounted on a plastic plunger operates integral magnet position sensors.

FEATURES

1ST LEVEL HALL-EFFECT SENSORS

SS400 Series.

Features: Hall-effect • Unipolar, bipolar, bipolar latch magnetics • Sinking output • Negative compensation slope • Customizable operate/release points • High output current capability • Low power consumption

Benefits: Quad Hall effect design minimizes effects of mechanical or thermal stress on output and provides stable output. Negative compensation slope optimized to match negative temperature coefficient of lower cost magnets, providing robust design over wide temperature range. Band gap regulation provides stable operation over supply voltage range. Low power consumption enhances energy efficiency. Potential applications include speed and RPM sensing, brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, tape rotation, and flow-rate sensing.

SS40A Series.

Features: Hall effect • Bipolar magnetics • Sinking output • High output current capability • High speed capability • Reverse voltage polarity protection

Benefits: Integrated circuitry provides enhanced temperature stability and accuracy in robust design. Thermally balanced integrated circuit over full temperature range. Built-in regulator provides stable operation over supply voltage range. Open-collector sinking output voltage easily interfaces with wide variety of electronic circuits. Low power consumption enhances energy efficiency. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Potential applications include speed and RPM sensing, brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, tape rotation, and flow-rate sensing.

SS41.

Features: Hall effect • Bipolar magnetics • Sinking output • High output current capability • Reverse voltage polarity protection

Benefits: Built-in regulator provides enhanced operational stability over supply voltage range. Open-collector digital sinking output voltage easily interfaces with wide variety of electronic circuits. Low power consumption enhances energy efficiency. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Potential applications include brushless dc motor commutation, motor and fan control, magnetic encoding, and tape rotation sensing.

SS421 Series.

Features: Hall effect • Bipolar magnetics • Sinking output • Active high and active low versions • Adjustable speed trip point with external resistor and capacitor • Temperature compensated

Magnetic Sensors Line Guide

Precision. Repeatability.

Ruggedness.

Each Honeywell S&C magnetic position sensor is engineered to provide top performance:

Hall-effect sensors are constructed from a thin sheet of conductive material with output connections perpendicular to the direction of current flow.

Magnetoresistive sensors have a built-in magnetoresistive bridge integrated on silicon, encapsulated in a plastic package. The integrated circuit responds to low fields at large distances.

Hall-effect vane sensors

consist of a magnet and a Hall-effect sensor inside a rugged plastic housing. Different package styles provide mounting flexibility.

Gear tooth sensors use a magnetically biased Hall-effect IC to sense movement of ferrous metal targets. The specially designed IC is sealed in a durable plastic probe-type package.

Additional built-in benefits:

true solid state, extended life (30 billion operations in a module test program), high speed operation (over 100 kHz), stationary input (zero speed), no moving parts, logic compatible input and output, and broad temperature range (-40 °C to 150 °C, -40 °F to 212 °F).



1st level Hall-effect sensors

SS400 Series

Description	Hall-effect digital position sensor
Magnetic actuation type	unipolar, bipolar, bipolar latch
Package material and style	plastic radial lead
Supply voltage range	3.8 Vdc to 30 Vdc (inclusive)
Supply current	10 mA
Output type	digital sinking
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]

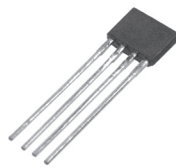
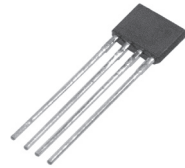


1st level Hall-effect sensors

SS40A Series

SS41

Description	low-cost bipolar Hall-effect digital position sensor	bipolar Hall-effect digital position sensor
Magnetic actuation type	bipolar	bipolar
Package material and style	plastic radial lead	plastic radial lead, plastic surface mount
Supply voltage range	4.5 Vdc to 24 Vdc	3.8 Vdc to 30 Vdc (inclusive)
Supply current	25 mA max.	15 mA max.
Output type	digital sinking (open collector)	digital sinking (open collector)
Operating temperature range	-55 °C to 150 °C [-40 °F to 302 °F]	-55 °C to 150 °C [-67 °F to 302 °F]



1st level Hall-effect sensors

SS421 Series

SS42R

SS46

SS49 Series

Description	adjustable bipolar Hall-effect digital underspeed detection sensor	bipolar latch active high/active low complementary output Hall-effect digital position sensor	bipolar latch Hall-effect digital position sensor	Hall-effect linear position sensor
Magnetic actuation type	bipolar	bipolar latch	bipolar latch	linear
Package material and style	plastic radial lead	plastic radial lead	plastic radial lead	plastic radial lead
Supply voltage range	4.5 Vdc to 16 Vdc	4.5 Vdc to 16 Vdc	3.8 Vdc to 24 Vdc (inclusive)	4 Vdc to 10 Vdc
Supply current	15 mA	11 mA	8.7 mA to 10 mA (inclusive)	5 mA
Output type	digital sinking	digital sinking or sourcing	digital sinking	ratiometric sourcing
Operating temperature range	-40 °C to 105 °C [-40 °F to 221 °F]	0 °C to 100 °C [32 °F to 212 °F]	-55 °C to 150 °C [-40 °F to 302 °F] (inclusive)	-40 °C to 100 °C [-40 °F to 212 °F]



1st level Hall-effect sensors

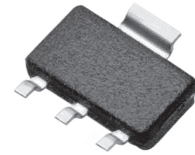
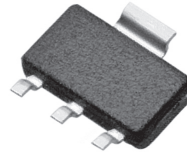
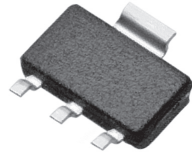
SS490

SS491B

SS49E

Description	Hall-effect linear position sensor	Hall-effect linear position sensor	low-cost Hall-effect linear position sensor
Magnetic actuation type	linear	linear	linear
Package material and style	plastic radial lead, plastic surface pack, ammopack styles T2 and T3	plastic radial lead	plastic radial lead
Supply voltage range	4.5 Vdc to 10.5 Vdc	4.5 Vdc to 10.5 Vdc	3 Vdc to 6.5 Vdc
Supply current	10 mA	10 mA	10 mA
Output type	ratiometric sinking or sourcing	ratiometric sinking or sourcing	ratiometric sourcing
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 100 °C [-40 °F to 212 °F]

Magnetic Sensors Line Guide



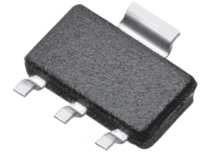
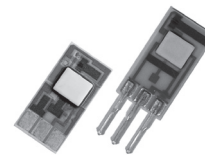
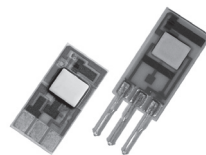
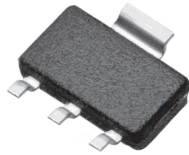
1st level Hall-effect sensors

SS500 Series

SS50AT

SS552MT

Description	unipolar/bipolar/bipolar latch Hall-effect digital position sensor	low-cost bipolar Hall-effect digital position sensor	omnipolar magnetoresistive digital position sensor
Magnetic actuation type	unipolar, bipolar, bipolar latch	bipolar	omnipolar
Package material and style	plastic surface mount (SOT-89 style)	plastic surface mount (SOT-89 style)	plastic surface mount (SOT-89 style)
Supply voltage range	3.8 Vdc to 30 Vdc	4.5 Vdc to 24 Vdc	3.8 Vdc to 30 Vdc
Supply current	8.7 mA at 5 Vdc	10 mA	11 mA
Output type	digital sinking	digital sinking (open collector)	digital sinking
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 150 °C [-40 to 302 °F]



1st level Hall-effect sensors

SS59ET

SS94 Series

91SS Series

VF526DT

Description	low-cost Hall-effect linear position sensor	Hall-effect linear position sensor	Hall-effect linear position sensor	bipolar latch dual Hall-effect digital position sensor with speed and direction outputs
Magnetic actuation type	linear	linear	linear	bipolar latch
Package material and style	plastic surface mount (SOT-89 style)	ceramic SIP, ceramic with solder bumps	ceramic SIP, ceramic with solder bumps	plastic surface mount (SOT-89 style)
Supply voltage range	2.7 Vdc to 6.5 Vdc	4.5 Vdc to 12.6 Vdc	8 Vdc to 16 Vdc	3.4 Vdc to 24 Vdc
Supply current	10 mA	30 mA max.	19 mA	14 mA
Output type	ratiometric sourcing	ratiometric sinking or sourcing	ratiometric sinking or sourcing	digital sinking
Operating temperature range	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]



1st level magnetoresistive sensors

2SS Series

APS Series

Description	omnipolar magnetoresistive sensor	dual bridge magnetoresistive position sensor
Magnetic actuation type	omnipolar	diametric field
Package material and style	plastic radial lead IC, surface mount	plastic surface mount
Supply voltage	3.8 Vdc to 30 Vdc	12 Vdc max.
Supply current	11 mA	7 mA
Output type	digital sinking	$\sin(2\Theta)$, $\cos(2\Theta)$
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]



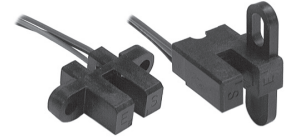
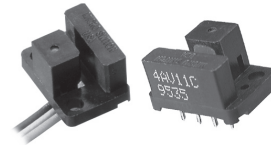
2nd level value-added Hall-effect sensors

103SR Series (Digital)

103SR Series (Linear)

Description	Hall-effect digital position sensor	Hall-effect linear position sensor
Package material and style	aluminum threaded barrel	aluminum threaded barrel
Magnetic actuation	unipolar, bipolar, bipolar latch	linear
Operation	proximity to external magnet	proximity to external magnet
Supply voltage range	4.5 Vdc to 24 Vdc	4.5 Vdc to 10.5 Vdc
Supply current	4 mA to 10 mA (inclusive)	7 mA
Output type	digital sinking or sourcing (depends on listing)	ratiometric sinking/sourcing
Operating temperature range	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 100 °C [-40 °F to 212 °F]

Magnetic Sensors Line Guide



2nd level value-added Hall-effect sensors

1GT Series

4AV Series

SR16/SR17 Series

Description	Hall-effect sensor	Hall-effect vane sensor	low-cost Hall-effect vane sensor
Package material and style	plastic probe	plastic dual tower wire exit, plastic dual tower with connector	SR16: plastic dual tower with variety of terminations SR17: plastic side-mount wire exit
Magnetic actuation	–	–	–
Operation	ferrous metal actuator	ferrous metal actuator	ferrous metal actuator
Supply voltage range	4.5 Vdc to 26.5 Vdc (inclusive)	4.5 Vdc to 24 Vdc	3.8 Vdc to 30 Vdc
Supply current	20 mA	18.5 mA	10 mA
Output type	digital sinking (open collector)	digital sinking	digital sinking
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]	-20 °C to 85 °C [-4 °F to 185 °F]



2nd level value-added Hall-effect sensors

SR3 Series

SR4 Series

VX10/VX80 Series

Description	Hall-effect digital position sensor	magnetoresistive digital position sensor	Hall-effect solid state switch
Package material and style	plastic threaded barrel	plastic threaded barrel	plastic mechanical switch
Magnetic actuation	unipolar, bipolar	omnipolar	–
Operation	proximity to external magnet	proximity to external magnet	plunger actuator
Supply voltage range	4.5 Vdc to 24 Vdc	3.8 Vdc to 30 Vdc	4 Vdc to 24 Vdc
Supply current	10 mA	11 mA	15 mA
Output type	digital sinking	digital sinking	digital sinking
Operating temperature range	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 75 °C [-40 °F to 167 °F]

Speed and direction sensors



1GT Series



GTN Series

Description	single Hall-effect sensor	single Hall-effect sensor
Supply voltage range	4.5 Vdc to 26.5 Vdc (inclusive)	8 Vdc to 32 Vdc (inclusive)
Supply current	20 mA	40 mA
Output type	digital sinking (open collector)	digital sinking (open collector)
Operating frequency range	0 Hz to 25 kHz (inclusive)	2 Hz to 9 kHz
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 125 °C [-40 °F to 257 °F]

Speed and direction sensors



LCZ Series



SNDH Series

Description	single Hall-effect zero speed sensor	dual differential Hall-effect quadrature speed and direction sensor
Housing	stainless steel	n/a
Supply voltage range	4.5 Vdc to 26 Vdc	4.5 Vdc to 18 Vdc
Supply current	20 mA	18 mA max.
Output type	digital sinking	square wave
Operating frequency range	0 Hz to 15 kHz	1 Hz to 15 kHz
Operating temperature range	-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

Magnetic Sensors Line Guide



Speed and direction sensors

SNDJ Series

ZH10 Series

Description	zero speed Hall-effect sensor, differential Hall-effect sensor, dual Hall-effect sensor	single Hall-effect zero speed sensor
Housing	n/a	aluminum
Supply voltage range	8 Vdc to 32 Vdc (inclusive)	4 Vdc to 24 Vdc
Supply current	10 mA to 20 mA max. (inclusive)	6 mA
Output type	square wave and one direction signal, square wave signal from NPN output transistor with 2.7 kOhm pull-up, dc-coupled to supply, square wave signal from push-pull stage, dc-coupled to supply	digital sinking
Operating frequency range	0 Hz to 15 kHz (inclusive)	0 Hz to 15 kHz
Operating temperature range	-20 °C to 100 °C [-4 °F to 212 °F]	-40 °C to 125 °C [-40 °F to 257 °F]



Passive speed sensors

VRS General Purpose Series

VRS Hazardous Location Series

Output voltage range	8 Vp-p to 40 Vp-p (inclusive)	30 Vp-p to 60 Vp-p (inclusive)
Housing diameter	5/8 in, 3/8 in, 1/4 in, 10/32 in	3/4 in, 5/8 in
Housing material and style	stainless steel threaded or smooth	stainless steel threaded
Termination	MS3106 connector, preleaded	MS3106 connector, preleaded
Operating temperature range	-55 °C to 120 °C [-67 °F to 250 °F] (inclusive)	-73 °C to 120 °C [-100 °F to 250 °F] (inclusive)



Passive speed sensors

VRS High Output Series

VRS High Resolution Series

VRS High Temperature Series

Output voltage range	8 Vp-p to 190 Vp-p (inclusive)	17 Vp-p to 170 Vp-p	4.7 Vp-p to 125 Vp-p (inclusive)
Housing diameter	5/8 in, 3/8 in	5/8 in, 3/8 in	5/8 in, 3/8 in, 1/4 in
Housing material and style	stainless steel threaded or smooth	stainless steel threaded	stainless steel threaded
Termination	MS3106 connector, preleaded	MS3106 connector, preleaded	MS3106 connector, preleaded
Operating temperature range	-55 °C to 150 °C [-67 °F to 300 °F] (inclusive)	-55 °C to 120 °C [-67 °F to 250 °F]	-73 °C to 230 °C [-100 °F to 450 °F] (inclusive)



Passive speed sensors

VRS Low-Cost Molded Series

VRS Power Output Series

Output voltage range	10 Vp-p to 190 Vp-p (inclusive)	70 Vp-p (inclusive)
Housing diameter	0.505 in, 7/16 in, 0.292 in, 1/4 in	5/8 in
Housing material and style	plastic smooth or threaded	stainless steel threaded
Termination	crimp, pin, preleaded	MS3106 connector, preleaded
Operating temperature range	-55 °C to 230 °C [-67 °F to 450 °F] (inclusive)	-55 °C to 120 °C [-67 °F to 250 °F]



Speed sensor building blocks

1GM Series

1GP Series

1GQ Series

Description	magnetostrictive	Hall-effect	Hall-effect
Target geometry	complementary target	equal slots, tooth size can vary	slot size can vary, tooth size can vary
Housing material	plastic	metal	metal
Zero speed sensing	yes	no	no
Power supply range	4.5 Vdc to 16 Vdc	4.5 Vdc to 24 Vdc	5 Vdc to 26.5 Vdc
Output	digital current sinking	digital current sinking	digital current sinking
Operating speed	up to 100 kHz	up to 100 kHz	up to 100 kHz
Operating temperature range	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]	-40 °C to 150 °C [-40 °F to 302 °F]

Benefits: Internal circuitry contains timer so that one or two pulses at slower repetition rate than set point do not produce unwanted output. Small amount of hysteresis built into output provides operation right at set point and does not result in chattering output. User-provided external resistor and capacitor combination selects speed trip point for particular application. Temperature compensated for consistent operation with low-cost magnets. Built-in timing circuit designed to simplify and reduce cost of PC board design. Potential applications include monitor fan or motor performance.

SS42R.

Features: Hall effect • Bipolar latch magnetics • Sinking or sourcing outputs • High output current capability • Reverse voltage polarity protection

Benefits: Hall-effect integrated circuit with pair of complementary push/pull outputs. Dual Hall-effect element offsets stress-induced noise and drift. Operate and release points laser trimmed to provide near-zero symmetry. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Potential applications include conveyors, motor control, ignition timing, power sensing, linear or rotary motion detection, and RPM sensing.

SS46.

Features: Hall effect • Bipolar latch magnetics • Sinking or sourcing output • Negative compensation slope • High output current capability • High speed capability • Reverse voltage polarity protection

Benefits: Integrated circuitry provides enhanced temperature stability and accuracy over full temperature range. Negative compensation slope optimized to match negative temperature coefficient of lower cost magnets. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Open-collector sinking output voltage easily interfaces with wide variety of electronic circuits. Low power consumption enhances energy efficiency. Internal circuitry prevents

sensor damage in case supply voltage polarity is accidentally reversed. Potential applications include speed and RPM sensing, brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, tape rotation, and flow-rate sensing.

SS49 Series.

Features: Hall effect • Ratiometric magnetics • Sourcing output • Positive temperature coefficient • Low power consumption • Different package styles

Benefits: Quad Hall-effect design minimizes effects of mechanical or thermal stress on output and provides stable output. Laser-trimmed thin film resistors provide enhanced accuracy and temperature compensation to reduce null and gain shift over temperature. Positive temperature coefficient helps compensate for negative temperature coefficients of low cost magnets, providing robust design over wide temperature range. Rail-to-rail operation provides more useable signal for enhanced accuracy. Low power consumption for energy efficiency. Potential applications include motor control, position sensing, magnetic code reading, rotary encoder, ferrous metal detection, vibration, and weight sensing.

SS490.

Features: Hall effect • Ratiometric magnetics • Sinking or sourcing output • Positive temperature coefficient • Low power consumption • Different package styles

Benefits: Quad Hall effect design minimizes effects of mechanical or thermal stress on output and provides stable output. Laser-trimmed thin film resistors provide enhanced accuracy and temperature compensation to reduce null and gain shift over temperature. Positive temperature coefficient helps compensate for negative temperature coefficients of low cost magnets, providing robust design over wide temperature range. Rail-to-rail operation provides more useable signal for enhanced accuracy. Low power consumption enhances energy efficiency. Potential applications include motor control, position sensing, magnetic code

reading, rotary encoding, ferrous metal detection, vibration, and weight sensing applications.

SS491B.

Features: Hall effect • Ratiometric magnetics • Sinking or sourcing output • Positive temperature coefficient • Low power consumption

Benefits: Quad Hall-effect design minimizes effects of mechanical or thermal stress on output and provides stable output. Laser-trimmed thin film resistors provide enhanced accuracy and temperature compensation to reduce null and gain shift over temperature. Positive temperature coefficient helps compensate for negative temperature coefficients of low cost magnets, providing robust design over wide temperature range. Rail-to-rail operation provides more useable signal for enhanced accuracy. Low power consumption enhances energy efficiency. Potential applications include motor control, position sensing, magnetic code reading, rotary encoding, ferrous metal detection, vibration, and weight sensing.

SS49E.

Features: Hall effect • Ratiometric magnetics • Sourcing output • Low noise output • Low-voltage operation • Low power consumption

Benefits: Integrated circuitry features low noise output, after eliminating external filtering. Thin film resistors provide enhanced temperature stability and accuracy. Low power consumption for energy efficiency. Potential applications include current sensing, motor control, position sensing, magnetic code reading, ferrous metal detection, vibration, and liquid level sensing.

SS500 Series.

Features: Hall effect • Unipolar, bipolar, bipolar latch magnetics • Negative compensation slope • Sinking output • Temperature compensated magnetics • High output current capability • Low power consumption • Small, surface mount package • Tape and reel

Benefits: Quad Hall-effect design often minimizes effects of mechanical or thermal stress on output and is designed to provide stable output. Built-in temperature compensation has negative slope optimized to match negative temperature coefficient of low cost magnets and track their performance over temperature. Band gap regulation provides stable operation over full supply voltage range. May be directly interfaced with many electronic components without buffering or compensation circuitry. Low power consumption enhances energy efficiency. Small, surface-mount package allows automated, lower-cost assembly. Potential applications include brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, and tape rotation.

SS50AT.

Features: Hall effect • Bipolar magnetics • Sinking output • High output current capability • High speed • Low power consumption • Reverse voltage polarity protection • Small, surface mount package • Tape and reel

Benefits: Thermally balanced integrated circuit accurate over full temperature range provides enhanced temperature stability and accuracy. Built-in regulator provides stable operation over supply voltage range. Open-collector sinking output voltage easily interfaces with wide variety of electronic circuits. Low power consumption enhances energy efficiency. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Small, surface-mount package allows automated, lower-cost assembly. Potential applications include brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, and tape rotation.

SS552MT.

Features: Magnetoresistive • Omnipolar magnetics • Sinking output • Low gauss operation • Operating speed of 0 kHz to over 100 kHz • Small, surface mount package • Tape and reel

Benefits: Low gauss operation extends sensing distance to one inch or more, depending on size. Small, surface-mount package allows automated, lower-cost assembly. Potential polarity independent applications include presence/absence detection, lid sensor for laptop computers, position sensing for material handling equipment, and cylinder position sensing in pneumatic cylinders

SS59ET.

Features: Hall effect • Ratiometric magnetics • Sourcing output • Low noise output • Low-voltage operation • Low power consumption • Small, surface mount package • Available on tape and reel

Benefits: Integrated circuitry features low noise output often eliminating external filtering. Thin film resistors provide enhanced temperature stability and accuracy. Low power consumption enhancing energy efficiency. Potential applications include speed and RPM sensing, brushless dc motor commutation, motor and fan control, magnetic encoding, disc speed, tape rotation sensing, and flow-rate sensing.

SS94 Series.

Features: Hall effect • Ratiometric magnetics • Sinking or sourcing output • Standard mounting centers • Linearity is $\pm 1.5\%$ max. • Two package styles

Benefits: Hall-effect integrated circuit chip provides enhanced temperature stability and performance. Laser-trimmed, thick film resistors on ceramic substrate and thin film resistors on integrated circuit reduce null and gain shifts over temperature, resulting in consistent sensitivity between devices. Includes low drift, high sensitivity, noise shielded, and general purpose listings. Potential applications include robotics control, current sensing, linear or rotary motion detection, and length measurement.

VF526DT.

Features: Speed and direction • Hall effect • Bipolar latch magnetics • Sinking output • Temperature compensated • Low power consumption • Small, surface mount package • Tape and reel

Benefits: Single package includes two separate Hall-effect sensors. Frequency signal provides speed output; logic level (high or low) signal provides direction output of a magnetic gradient across package face. Built-in temperature compensation optimized to match temperature coefficient of low cost magnets and track their performance over temperature. Unique regulator circuit provides stable operation over supply voltages range. May be directly interfaced with many electronic components without buffering or compensation. Low power consumption enhances energy efficiency. Small, surface-mount package allows automated, lower-cost assembly. Potential applications include power seats (headrest), power sliding doors, sunroofs, garage door openers, magnetic encoding for electronic steering systems, and motion control systems for pulleys and belts.

91SS Series.

Features: Hall effect • Ratiometric magnetics • Sinking or sourcing output • Standard mounting centers • Linearity is $\pm 1.5\%$ max. • Two package styles

Benefits: Hall-effect integrated circuit chip provides enhanced temperature stability and performance. Laser-trimmed, thick film resistors on ceramic substrate and thin film resistors on integrated circuit reduce null and gain shifts over temperature, resulting in consistent sensitivity between devices. Potential applications include robotics control, current sensing, linear or rotary motion detection, and length measurement.

1ST LEVEL MAGNETORESISTIVE SENSORS

2SS Series.

Features: Omnipolar • Digital sinking output • Low gauss operation • Operating speed of 0 kHz to 100 kHz • Small size

Benefits: Low gauss operation extends sensing distance to one inch or more, depending on magnet size. Potential applications include weaker field/larger detection distance and polarity independent applications such as lid

sensing for laptop computers, position sensing for material handling equipment, and cylinder position sensing in pneumatic cylinders.

APS Series.

Features: Sine and cosine output

- Accurate to 0.102 mm [0.004 in]
- Miniature size • Tape and reel

Benefits: Dual bridge provides sine and cosine output. Miniature size allows multiple sensors to be used in a small area and in an array of configurations such as arcs, lines, and circles. Available on tape on reel for automated assembly and pick and place. Especially suited for potential rotary position sensing applications.

2ND LEVEL VALUE-ADDED HALL-EFFECT SENSORS

103SR Series (Digital).

Features: Hall effect • Unipolar, bipolar, bipolar latch magnetics • Sinking or sourcing output • Aluminum housing

- Color-coded, jacketed cable
- Adjustable mounting

Benefits: Rugged, threaded aluminum housing. Choice of cable materials provides application flexibility. Potential applications include position and RPM sensing in non-corrosive.

103SR Series (Linear).

Features: Hall effect • Ratiometric magnetics • Sinking/sourcing output

- Aluminum housing • Color-coded, jacketed cable • Adjustable mounting

Benefits: Rugged, threaded aluminum housing. Choice of cable materials provides application flexibility. Potential applications include position and RPM sensing in non-corrosive applications.

1GT Series.

Features: Hall effect • Sinking output

- Fast operating speed • Reverse polarity and transient protection • EMI resistant
- Wide continuous operating temperature range • Probe-style package

Benefits: Magnetically-biased, Hall-effect integrated circuit accurately senses movement of ferrous metal targets. Sealed

in probe-style package for physical protection and cost-effective installation. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Enhanced low speed performance, output amplitude not dependent on RPM. Sensor electronically self-adjusts to slight variations in runout and temperature, simplifying installation and maintenance. Potential applications include camshaft and crankshaft speed and position, transmission speed, and tachometer, as well as anti-skid and traction control.

4AV Series.

Features: Magnet and sensor incorporated in same rugged package

- Hall effect • Sinking output • Zero speed capability • On and off times programmable by vane dimensioning
- Precision mechanical operating characteristics

Benefits: May be used as limit switch by operating with single large vane, as tachometer sensor by using toothed wheels, or as synchronizing element by using cams or sectors. Closely controlled differential predicts pulse width. Sealed construction unaffected by dust or dirt. Potential applications include sprocket speed, detection, and tachometer.

SR16/SR17 Series.

Features: Hall effect • Sinking output

- Non-contact position sensing
- Compact, robust packages
- Environmentally sealed package • Three terminations available

Benefits: Internal magnet and Hall-effect sensor mounted in dual tower or side mount configuration for application flexibility. Mechanically interchangeable with standard optical sensors. Medium level magnetic switching reduces stray field interference. No mechanical contacts often eliminates product wear. Environmentally sealed plastic package provides enhanced accuracy and repeatability in environments in which dirt, dust, or stray IR light might affect performance of optical solutions.

Potential applications include position and speed sensing in fitness and information technology, as well as in moderate electrical, chemical, and mechanical environments.

SR3 Series.

Features: Hall effect • Unipolar, bipolar magnetics • Sinking output • Frequencies exceeding 100 Hz

Benefits: Plastic housing for position and RPM sensing in potential corrosive applications such as food and beverage, chemical plants, and refineries.

SR4 Series.

Features: Magnetoresistive • Omnipolar magnetics • Sinking output

Benefits: Magnetoresistive technology allows enhanced sensing distance at lower gauss than Hall effect. Plastic housing for position and RPM sensing in potential corrosive applications such as food and beverage, chemical plants, and refineries.

VX10/VX80 Series.

Features: Hall effect • Sinking output

- Non-contact, low force operation
- Reverse voltage protection • Rugged construction • Standard levers and actuators available • Lever external to switch body • Industry-standard mounting holes • Miniature size

Benefits: Combines miniature size, mechanical switch construction, operating and mounting convenience with solid state reliability. Switching element is Hall-effect transducer with trigger and amplifier integrated on silicon chip. Integral magnet molded in plunger actuates transducer and produces digital logic level output for direct interface to solid state circuits. Internal circuitry prevents sensor damage in case supply voltage polarity is accidentally reversed. Uses standard keyed and locking plug-in connectors. Terminal pins accept AMP connectors. Potential applications include lid position sensing and coin detection.

SPEED AND DIRECTION SENSORS

1GT Series.

Features: Enhanced operating speed

- Reverse polarity and transient protection
- EMI resistant
- Wide continuous operating temperature range
- Probe-style package
- Enhanced low speed performance
- Output amplitude not dependent on RPM

Benefits: Sealed in probe-style package for physical protection and cost-effective installation. Sensor electronically self-adjusts to slight variations in runout and temperature, simplifying installation and maintenance. Circuit senses movement of targets in potential applications such as camshaft and crankshaft speed and position, transmission speed, and tachometer, as well as anti-skid and traction control.

GTN Series.

Features: Choice of barrel lengths

- Integrated electronic diagnostics
- Enhanced operating speed
- EMI resistant
- Reverse polarity and transient protection
- Wide continuous operating temperature range
- Probe-style package
- Enhanced low speed performance
- Output amplitude not dependent on RPM

Benefits: Sealed in probe-style package for physical protection and cost-effective installation. Sensor electronically self-adjusts to slight variations in runout and temperature, simplifying installation and maintenance. Integrated electronic diagnostics detect open or short circuits in power supply line by monitoring sensor output. Circuit senses movement of ferrous metal targets in potential applications such as camshaft and crankshaft speed and position, transmission speed, and tachometer, as well as anti-skid and traction control.

LCZ Series.

Features: Stainless steel package • Low cost • Omni-directional sensor to target orientation • Low power consumption

- Small size
- Zero speed
- Digital output
- Durable, cost-effective sensing solution
- Screw-in package style

Benefits: Available in several diameters and lengths for application flexibility.

Stainless steel package simple to install/adjust and does not require rotational orientation. Potential applications include harsh environment rotary applications such as pumps, rollers, mixers, fan speed measurement, transmission, spindles, gear reducer RPM, synchronization, compressor speed, and dyno testing, as well as industrial process control and factory automation.

SNDH Series.

Features: Advanced performance dynamic offset self calibration • Short circuit and reverse voltage protection

- Air gap up to 2 mm [0.08 in]
- Low jitter output
- Near-zero speed
- EMI hardened
- High frequency switching capability
- Multiple connector options includes wire harness and integral connector versions using AMP super seal or AMP Jr.
- Probe-style package
- Integrated circuit packaging provides output phase shift tolerancing with enhanced accuracy

Benefits: Provides speed and direction information using quadrature output with signals 90 degree phase shifted from each other. BiCMOS Hall-effect technology, using advanced digital signal processing for dynamic off-set cancellation, provides enhanced air gap performance and phase shift accuracy over most conditions. Package design includes O-ring seal for potential pressure applications and a fixed mounting flange. Robust, automotive under-the-hood grade packaging for most environmental conditions as well as EMI hardened. Used in potential applications where high resolution is required at wide frequency ranges and large air gaps.

SNDJ Series.

Features: Three housing styles • Three different outputs • Direct sensing of ferrous metal target • Zero speed sensing capabilities (some listings) • Stainless steel housing • Probe and screw-in package styles • Rotational orientation independent of sensor function

Benefits: Used with ferromagnetic gears or pole wheel to generate impulse frequencies proportional to target speed. Rugged stainless steel housing for potential applications found in high speed

gear tooth sensing, over-speed detection, and rotary gear or shaft position detection.

ZH10.

Features: Aluminum package • Low cost • Omni-directional sensor to target orientation • Low power consumption

- Small size
 - Zero speed
 - Digital output
 - Durable, cost-effective sensing solution
 - Screw-in package style
- Benefits:** Aluminum package simple to install/adjust and does not require rotational orientation. Potential applications include harsh environment rotary applications such as pumps, rollers, mixers, fan speed measurement, transmission, spindles, gear reducer RPM, synchronization, compressor speed, and dyno testing, as well as industrial process control and factory automation.

PASSIVE SPEED SENSORS

VRS General Purpose Series, VRS Hazardous Location Series, VRS High Output Series, VRS High Resolution Series, VRS High Temperature Series, VRS Low-Cost Molded Series, VRS Power Output Series.

Features: Self-powered operation

- Simple installation
- No moving parts
- Operates over wide speed range
- Adaptable to wide variety of configurations
- Customized versions for potential unique speed sensing applications

Benefits: All: Direct conversion of actuator speed to output frequency. VRS General Purpose Series, VRS Hazardous Location Series: Simple, rugged devices do not require external voltage source for operation. VRS High Output Series: Performs best at low to medium speeds with medium to high impedance loads. Sealed front-end versions available for use where sensor is exposed to fluids, lubricants, or adverse environmental conditions. VRS High Resolution Series: Proper sensor alignment is required. VRS High Temperature Series: Sealed front-end versions for potential applications where sensor is exposed to fluids, lubricants, or adverse environmental conditions.

Potential applications: VRS General Purpose Series: Engine and motor RPM, process, flow, wheel-slip, and gear speed measurement with medium to high speeds or in electrically noisy environments with relatively small air gaps. VRS Hazardous Location Series: Engine and motor RPM, process, flow, wheel-slip, and gear speed measurement where explosion-proof or intrinsically safe sensors are required. VRS High Output Series: Engine and motor RPM, process, flow, wheel-slip, and gear speed measurement where higher output voltages are needed. VRS High Resolution Series: Engine and motor RPM, process, flow, wheel-slip, and gear speed measurement where precise timing pulse is required, and/or fine pitch gears are used. VRS High Temperature Series: Engine and motor RPM, process, flow, wheel-slip, and gear speed measurement where sensor is exposed to temperatures up to 260 °C [450 °F]. VRS Low-Cost Molded Series: OEM. VRS Power Output Series: Driving low resistance loads at large air gaps in engine and motor RPM, process, flow, wheel-slip, and gear speed measurement where larger actuators may be used.

SPEED SENSOR BUILDING BLOCKS

1GM Series.

Features: Building block module • Power-on recognition sensing • Zero speed • Enhanced operating speed • Transient and reversed polarity protection • EMI resistant • Wide operating temperature range

Benefits: Enhanced accuracy, magnetoresistive sensor designed to provide zero-speed sensing when using a complementary target (both tooth and slot are in same sensing face) configuration. Potential applications include camshaft speed and position sensing.

1GP Series.

Features: Environmentally protected building block module • Optional inverted output • Enhanced low-speed performance • Output amplitude not dependent on target speed • Enhanced operating speed • Transient (ISO 7637/1) and reversed polarity protection • EMI resistant • Wide operating temperature range

Benefits: Hall-effect gear-tooth sensor accurately detects absence or presence of moving ferromagnetic target. Integrated circuit, discrete components, and magnet enclosed in environmentally-sealed, stainless steel can. Potential applications include camshaft and crankshaft speed and position sensing, transmission speed sensing, and tachometers.

1GQ Series.

Features: Environmentally protected building block module • Enhanced low-speed performance • Output amplitude not dependent on target speed • Optional inverted output • Enhanced operating speed • Transient (ISO 7637/1) and reversed polarity protection • EMI resistant • Wide operating temperature range • Can sense European 60-2 crank target

Benefits: Hall-effect gear-tooth sensor accurately detects absence or presence of moving ferromagnetic target. Integrated circuit, discrete components, and magnet enclosed in environmentally-sealed, cylindrical stainless steel housing. Symmetry not required; senses irregularly shaped targets as well as small teeth and slots. Potential applications include camshaft and crankshaft speed and position sensing, transmission speed sensing, and tachometers.

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Failure to comply with these instructions could result in death or serious injury.

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