

SPEED & PROXIMITY

SENSORS



High Performance & Reliability

Total Design Assistance

Advanced Manufacturing

**CHERRY** 

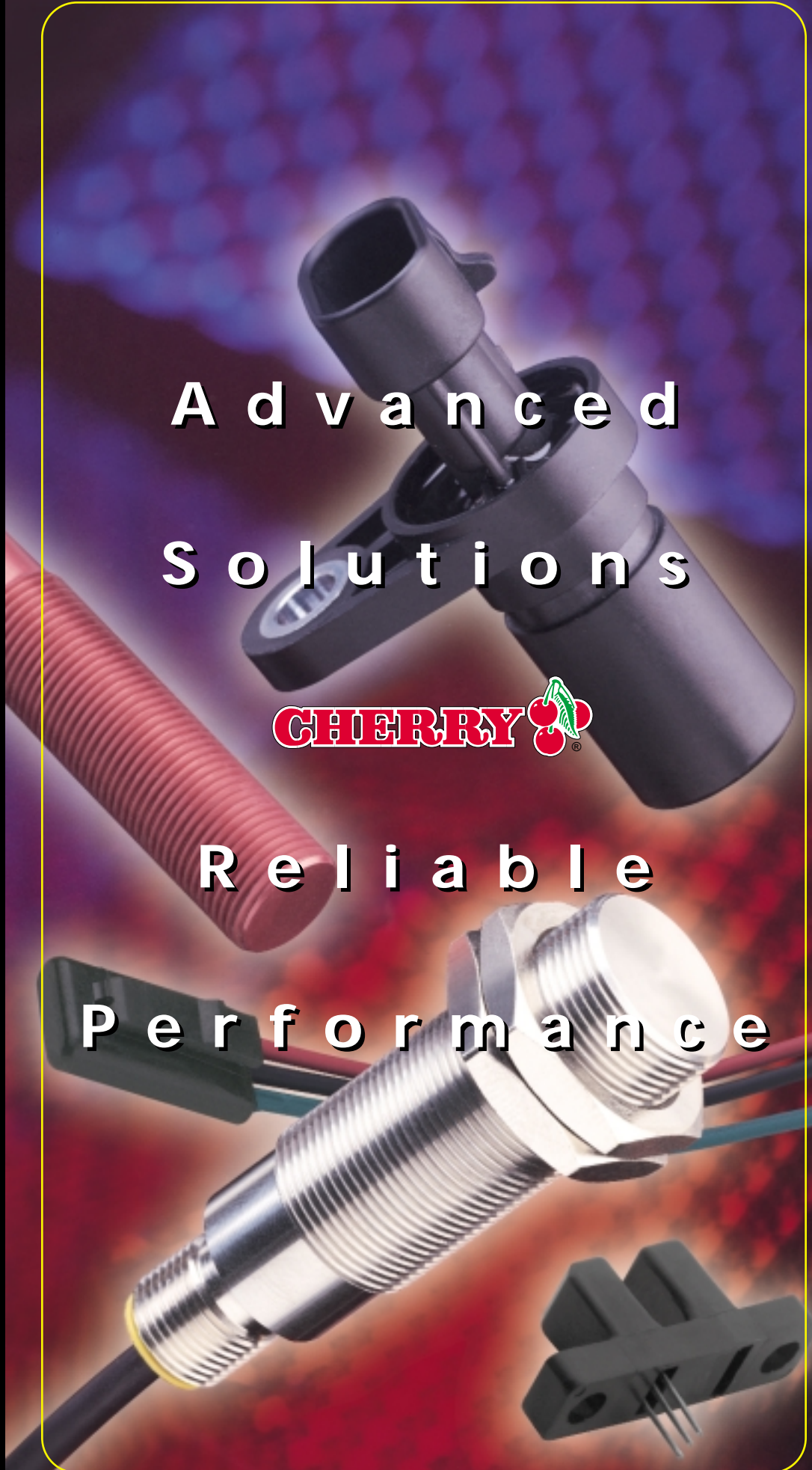
**A Worldwide Company  
With Old World Service**

Founded in 1953 by Walter L. Cherry, The Cherry Corporation manufactures proprietary and custom sensors, electrical switches, keyboards, and electronic controls for the automotive, computer, and consumer and commercial markets in this country and around the world. To compete in today's global marketplace, The Cherry Corporation maintains offices and production facilities in twelve U.S. and International locations. Each employs its own engineering and sales staff. Quality leadership, state-of-the-art technologies and customer satisfaction are the hallmarks of The Cherry Corporation.

**A d v a n c e d  
S o l u t i o n s**



**R e l i a b l e  
P e r f o r m a n c e**





**Cherry Sensor Products**

Cherry speed and proximity sensors bring tremendous freedom and unmatched performance and reliability to your consumer, commercial and industrial equipment designs. Available in a variety of standard sizes and configurations, they serve as highly reliable replacements for mechanical and optical components in applications where performance and reliability cannot be compromised, regardless of the operating environment. Dirt. Grime. Heat. Even electrical interference.



Available in a variety of configurations, all Cherry sensors feature rugged construction and are immune to dirt, water, oil and other contaminants typically found in agricultural and other heavy equipment applications.

Cherry speed and proximity sensors continue to perform. And with no moving parts, they do so with a virtually infinite life expectancy.

Our full line of speed and proximity sensors is divided into five product series to ease your selection process. These product series, detailed in this catalog, are as follows:

- MP Series — Magnetic Proximity Sensors
- GS Series — Geartooth Speed Sensor Assemblies
- SD Series — Geartooth Speed & Direction Sensors
- VN Series — Vane Switches
- Miscellaneous Products & Accessories



The direct, digital output offered by Cherry sensors ties directly to micro-processors used in advanced consumer and commercial-grade appliances.

**Your Total Design Partner**

To augment our line of standard sensor products, Cherry also offers a wide variety of packaging and wiring options to suit your application. If your design calls for a product we don't currently offer as part of our standard line, our in-house design staff will work with you to develop a semi- or fully-custom solution to your exact requirements.

Utilizing the latest design modeling and rapid prototyping tools, we offer unequaled product development assistance.

- In the initial design stages, our magnetic modeling capabilities serve to verify the design concept, while also helping to obtain the optimal match of sensor and magnet to your application.
- Once the design concept is approved, we enter the physical prototyping stage, using Pro Engineering solid modeling software to create the physical design and stereolithography for rapid prototyping. Our in-house plastic molding capabilities allow us to provide prototype or production parts in a very timely manner.
- Finally, our certified qualification lab offers complete environmental testing, product life testing and magnetic test capabilities; the final step in readying your sensor solution for final production.



**World-Class Manufacturing**

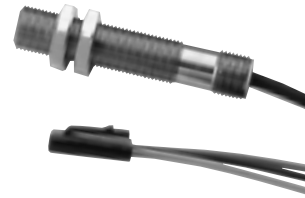
Incorporating the Kaizen philosophy of continual improvement, our Advanced Manufacturing Group has designed and developed proprietary assembly equipment to provide you unmatched production flexibility. The capabilities of our ISO9001 Certified Manufacturing Center range from plastic molding to automated surface mount circuit board assembly.

Cherry sensor products offer accurate and reliable speed and proximity sensing in demanding environments, making them ideal for industrial control and factory automation equipment.

From concept to completion, Cherry is your source for Advanced Sensor Solutions.

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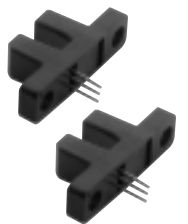
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**SD Series Speed and Direction Sensors**



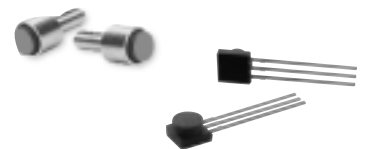
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**VN Series Vane Switches**



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**Misc. Products & Accessories**



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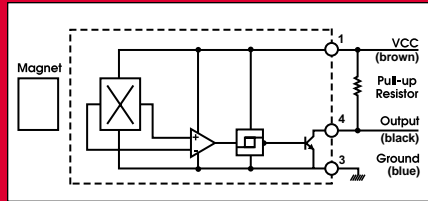
MP1001 Industrial Grade



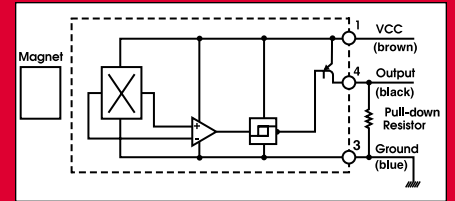
Solid State, magnetic proximity sensors in adjustable, threaded barrels.

- Immune to Hostile Environments
- High-Speed Capability
- Reverse Battery Protection to -24Vdc
- "CE Plus" Protection (with MP1001 Series)
- Sourcing or Open Collector Output
- MP100105 and MP100106 use Omnipolar GMR Sensing Element for Extra Wide Airgap
- South Pole Sensitive (except MP100105 and MP100106)
- M12 Integral Connector Meets IEC 60947-5-2

Open Collector Sinking Block Diagram



Sourcing Block Diagram



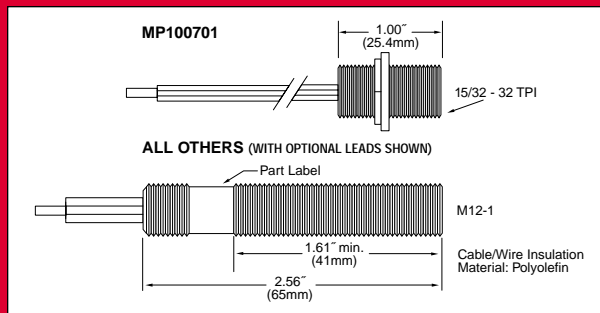
| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output        | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Operate Point, gauss (max.) | Release Point, gauss (min.) | Housing | Cable          | Connector     |
|----------|-------------------------------|------------------------|---------------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------------------------|-----------------------------|---------|----------------|---------------|
| MP100101 | 5 to 24                       | 12                     | 3-wire sink   | 700                               | 25                     | -40 to 105              | -40 to 105              | 300                         | 60                          | SST     |                | 12mm circular |
| MP100102 | 5 to 24                       | 12                     | 3-wire sink   | 700                               | 25                     | -40 to 125              | -40 to 125              | 300                         | 60                          | SST     | 22AWG x 1m BBB |               |
| MP100103 | 5 to 24                       | 12                     | 3-wire source | Vcc-900 min                       | 20                     | -40 to 105              | -40 to 105              | 300                         | 60                          | SST     |                | 12mm circular |
| MP100104 | 5 to 24                       | 12                     | 3-wire source | Vcc-900 min                       | 20                     | -40 to 125              | -40 to 125              | 300                         | 60                          | SST     | 22AWG x 1m BBB |               |
| MP100105 | 5 to 24                       | 10                     | 3-wire sink   | 700                               | 24                     | -40 to 105              | -40 to 105              | 25*                         | 1*                          | SST     |                | 12mm circular |
| MP100106 | 5 to 24                       | 10                     | 3-wire sink   | 700                               | 24                     | -40 to 125              | -40 to 125              | 25*                         | 1*                          | SST     | 22AWG x 1m BBB |               |

\*The GMR IC is approximately .100" inside the barrel. Gauss figures at the barrel end will be somewhat higher. Consult Cherry Engineering for details.

MP1005 Commercial Grade



Dimensions



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output        | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Operate Point, Gauss (max.) | Release Point, Gauss (min.) | Housing      | Leads           | Connector     |
|----------|-------------------------------|------------------------|---------------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------------------------|-----------------------------|--------------|-----------------|---------------|
| MP100501 | 4.75 to 24                    | 12                     | 3-wire sink   | 700                               | 25                     | -40 to 105              | -40 to 105              | 300                         | 60                          | Alum (red)   |                 | 12mm circular |
| MP100502 | 4.75 to 24                    | 12                     | 3-wire sink   | 700                               | 25                     | -40 to 125              | -40 to 125              | 300                         | 60                          | Alum (red)   | 20 AWG x 1m BBB |               |
| MP100503 | 4.75 to 24                    | 12                     | 3-wire source | Vcc-200 min                       | 25                     | -40 to 105              | -40 to 105              | 300                         | 60                          | Alum (red)   |                 | 12mm circular |
| MP100504 | 4.75 to 24                    | 12                     | 3-wire source | Vcc-200 min                       | 25                     | -40 to 125              | -40 to 125              | 300                         | 60                          | Alum (red)   | 20 AWG x 1m BBB |               |
| MP100701 | 4.75 to 24                    | 12                     | 3-wire sink   | 700                               | 25                     | -40 to 125              | -40 to 125              | 300                         | 60                          | Alum (black) | 20 AWG x 1m BBB |               |

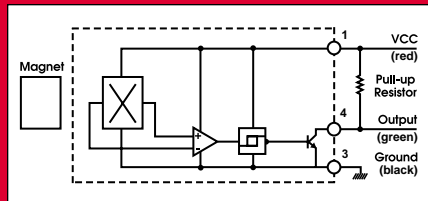
MP1013 Snap-Fit Proximity Sensor



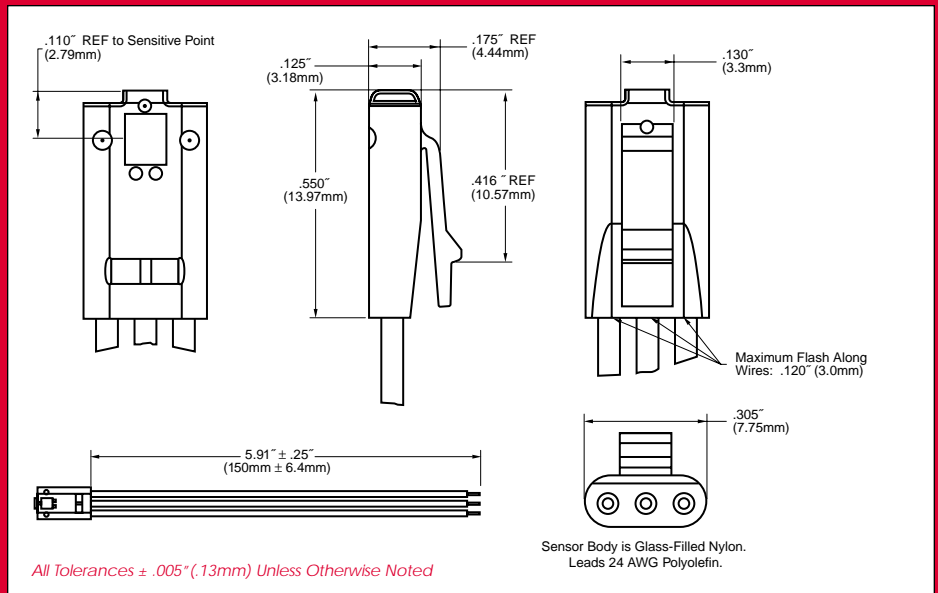
**Hall effect proximity sensor with convenient snap-fit mounting.**

- Solid State Reliability
- Excellent Temperature Stability
- Immune to Dirt, Dust, Moisture, etc.
- Reliable and Repeatable
- No Mechanical Contacts to Wear Out
- Digital Output Compatible With all Logic Families
- Operate From 4.5 to 24Vdc
- Reverse Battery Available

**Open Collector Sinking Block Diagram**



**Dimensions**



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output      | Output Saturation Voltage mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Operate Point, Gauss (max.) | Release Point, Gauss (min.) | Reverse Battery Protection |
|----------|-------------------------------|------------------------|-------------|----------------------------------|------------------------|-------------------------|-------------------------|-----------------------------|-----------------------------|----------------------------|
| MP101301 | 4.75 to 24                    | 12                     | 3-wire sink | 700                              | 25                     | -40 to 85               | -40 to 105              | 300                         | 60                          | -24                        |
| MP101302 | 4.75 to 24                    | 12                     | 3-wire sink | 700                              | 25                     | -40 to 125              | -40 to 125              | 300                         | 60                          | -24                        |
| MP101303 | 3.5 to 24                     | 12                     | 3-wire sink | 700                              | 25                     | -40 to 85               | -40 to 105              | 45                          | -45 (latch)                 | None                       |
| MP101304 | 3.5 to 24                     | 12                     | 3-wire sink | 700                              | 25                     | -40 to 125              | -40 to 125              | 45                          | -45 (latch)                 | None                       |

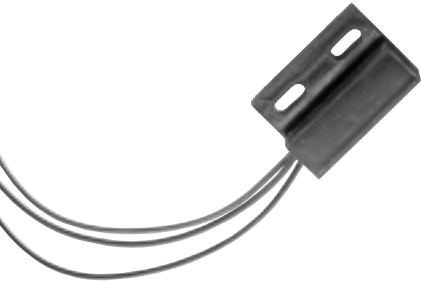
**MP Series Notes**

A: For sensors with integral connectors, mating cordsets are available from Cherry. Request Part Number AS000203 for a straight female connector or AS000204 for a right-angle female connector.

B: For further information, visit [www.cherrycorp.com](http://www.cherrycorp.com).

C: See page 14 for interface recommendations.

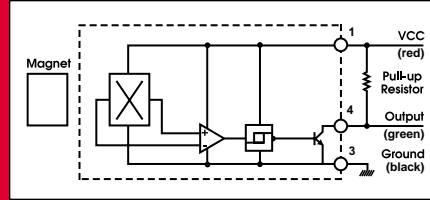
MP1021 Flange-Mount Proximity Sensor



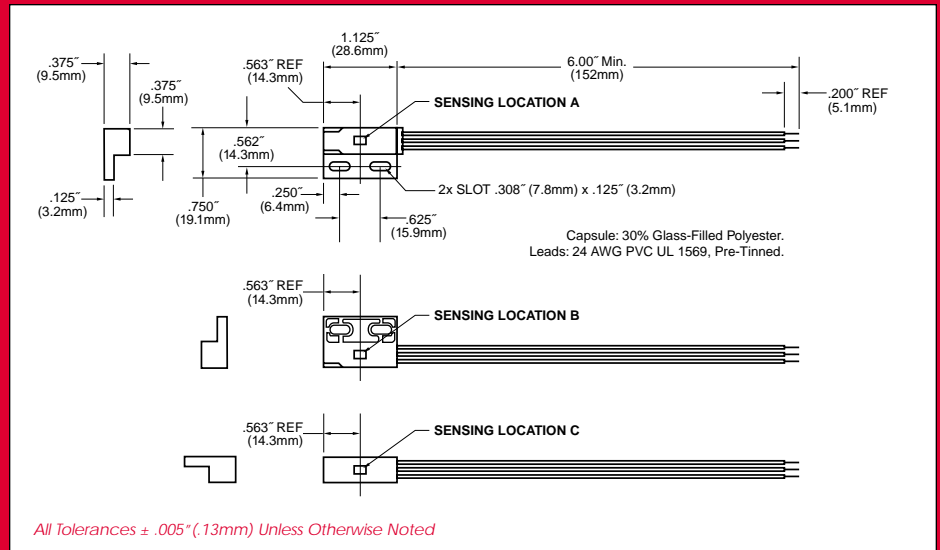
Digital Hall effect proximity sensor in plastic flange-mount housing.

- Virtually Unlimited Life
- Wide Operating Voltage Range
- 3 Different Sensing Orientations Available
- Suitable for High-Speed Switching
- Switch and Latch Versions Available
- Operated by North Pole of a Magnet
- Reverse Battery Protection Included

Open Collector Sinking Block Diagram



Dimensions



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output      | Output Saturation Voltage, mV max | Operate Temp. Range, °C | Function | Operate Point, Gauss (max.) | Release Point, Gauss (min.) | Sensing Location |
|----------|-------------------------------|------------------------|-------------|-----------------------------------|-------------------------|----------|-----------------------------|-----------------------------|------------------|
| MP102101 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | switch   | 300 (north)                 | 195 (north)                 | A                |
| MP102102 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | switch   | 300 (north)                 | 195 (north)                 | B                |
| MP102103 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | switch   | 300 (north)                 | 195 (north)                 | C                |
| MP102104 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | latch    | 60 (north)                  | 60 (south)                  | A                |
| MP102105 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | latch    | 60 (north)                  | 60 (south)                  | B                |
| MP102106 | 4.5 to 24                     | 12                     | 3-wire sink | 500                               | -40 to 85               | latch    | 60 (north)                  | 60 (south)                  | C                |

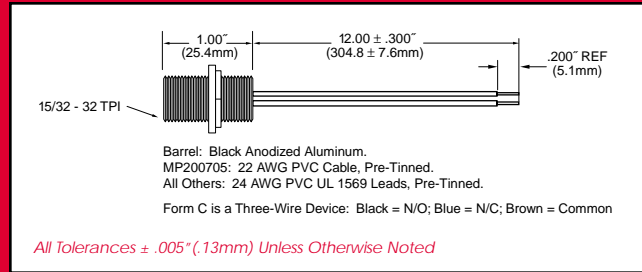
MP2007 Threaded Barrel Proximity Sensor



Reed-based magnetic proximity sensor in aluminum threaded barrel

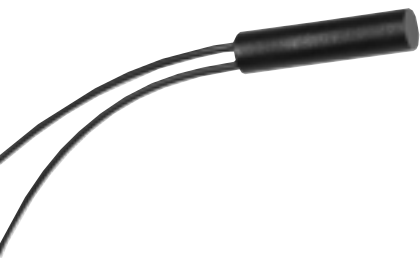
- Immune to hostile environments
- Zero power consumption
- Suitable for DC and AC circuits
- Hermetically sealed for long life

Dimensions



| Part #   | Contact Form   | Power Rating, W Max | Switching Voltage, VDC Max | Breakdown Voltage, VDC Min | Switching Current, Amps Max | Contact Resistance, Ohms Max | Operate Temp. Range, °C | Operate Time, msec Typ. |
|----------|----------------|---------------------|----------------------------|----------------------------|-----------------------------|------------------------------|-------------------------|-------------------------|
| MP200701 | SPST-NO Form A | 10                  | 175                        | 200                        | 0.5                         | 0.200                        | -40 to +105             | 0.6                     |
| MP200702 | SPST-NC Form B | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |
| MP200703 | SPDT-CO Form C | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |
| MP200705 | SPST-NO Form A | 10                  | 175                        | 200                        | 0.5                         | 0.200                        | -20 to +80              | 0.6                     |

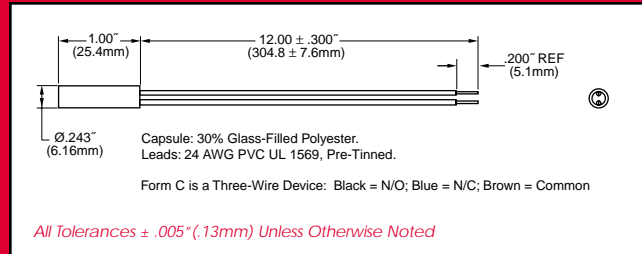
MP2017 Smooth Barrel Proximity Sensor



Reed-based magnetic proximity sensor encapsulated in plastic barrel

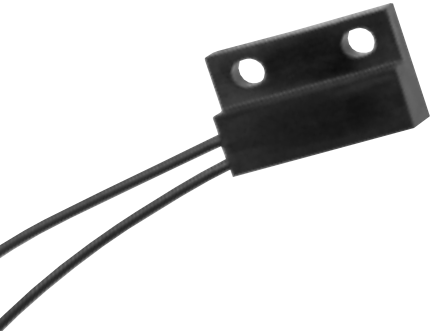
- Hermetically sealed for long life
- Resistant to moisture and dirt
- Available in a variety of standard contact configurations
- A standard magnetic actuator is available in the same package. Cherry part number AS201701

Dimensions



| Part #   | Contact Form   | Power Rating, W Max | Switching Voltage, VDC Max | Breakdown Voltage, VDC Min | Switching Current, Amps Max | Contact Resistance, Ohms Max | Operate Temp. Range, °C | Operate Time, msec Typ. |
|----------|----------------|---------------------|----------------------------|----------------------------|-----------------------------|------------------------------|-------------------------|-------------------------|
| MP201701 | SPST-NO Form A | 10                  | 175                        | 200                        | 0.5                         | 0.200                        | -40 to +105             | 0.6                     |
| MP201702 | SPST-NC Form B | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |
| MP201703 | SPDT-CO Form C | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |

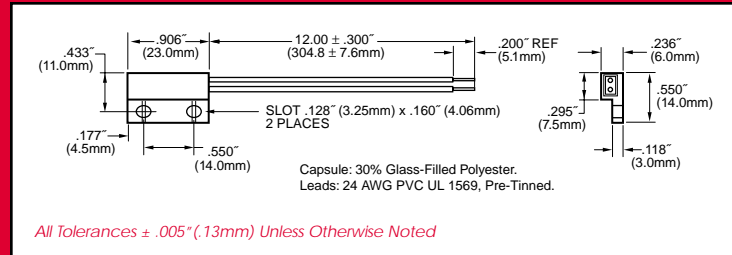
MP2018 Mini Flange-Mount Proximity Sensor



Reed-based magnetic proximity sensor encapsulated in plastic flange-mount package

- Resistant to moisture and dirt
- Operated by North or South pole
- Hermetically sealed for long life
- A standard magnetic actuator is available in the same package. Cherry part number AS201801

Dimensions



| Part #   | Contact Form   | Power Rating, W Max | Switching Voltage, VDC Max | Breakdown Voltage, VDC Min | Switching Current, Amps Max | Contact Resistance, Ohms Max | Operate Temp. Range, °C | Operate Time, msec Typ. |
|----------|----------------|---------------------|----------------------------|----------------------------|-----------------------------|------------------------------|-------------------------|-------------------------|
| MP201801 | SPST-NO Form A | 10                  | 175                        | 200                        | 0.5                         | 0.200                        | -40 to +105             | 0.6                     |
| MP201802 | SPST-NC Form B | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |

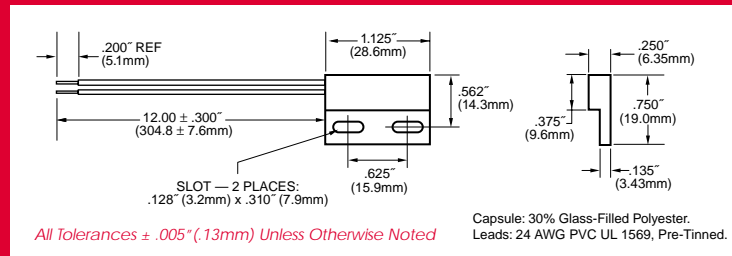
MP2019 Flange-Mount Proximity Sensor



Reed-based magnetic proximity sensor encapsulated in plastic flange-mount package

- Immune to hostile environments
- Hermetically sealed for long life
- Suitable for DC and AC circuits
- A standard magnetic actuator is available in the same package. Cherry part number AS201901

Dimensions



| Part #   | Contact Form   | Power Rating, W Max | Switching Voltage, VDC Max | Breakdown Voltage, VDC Min | Switching Current, Amps Max | Contact Resistance, Ohms Max | Operate Temp. Range, °C | Operate Time, msec Typ. |
|----------|----------------|---------------------|----------------------------|----------------------------|-----------------------------|------------------------------|-------------------------|-------------------------|
| MP201901 | SPST-NO Form A | 10                  | 175                        | 200                        | 0.5                         | 0.200                        | -40 to +105             | 0.6                     |
| MP201902 | SPST-NC Form B | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |
| MP201903 | SPDT-CO Form C | 3                   | 100                        | 200                        | 0.2                         | 0.200                        | -40 to +105             | 1                       |



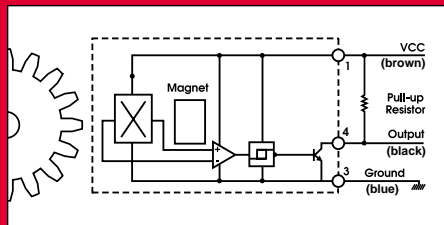
GS1001-1004 Industrial Grade



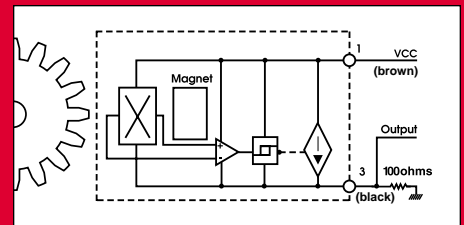
**Industrial-grade, Hall effect geartooth speed sensor with adjustable stainless steel housing.**

- Sense Motion of Ferrous Geartooth Targets
- Near-Zero Speed Sensing Capability
- Immune From Hostile Environments
- Not Subject to Rotational Orientation
- High-Speed Capability
- Reverse Battery Protection to -24VDC
- Wide Operating and Storage Temperature Range
- M12 Integral Connector Meets IEC60947-5-2
- Meet all IEC (International Electrotechnical Commission) Requirements for Heavy Industrial Environments, Assuring Immunity From:
  - Electrostatic Discharge
  - Electrical Transients
  - Radiated Electric Field
  - Conducted Energy
  - Magnetic Field Energy

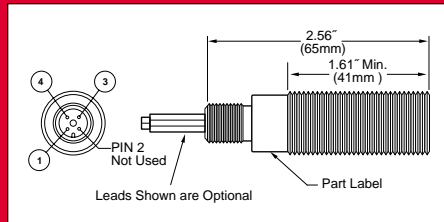
**Open Collector Sinking Block Diagram**



**2-Wire Interface Block Diagram**



**Dimensions**



| Part #   | Operating Voltage Range (VDC) | Supply current, mA max | Output       | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Thread    | Barrel Length | Cable           | Connector     |
|----------|-------------------------------|------------------------|--------------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------|---------------|-----------------|---------------|
| GS100101 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 105              | -40 to 105              | M12-1     | 65mm          |                 | 12mm circular |
| GS100102 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 125              | -40 to 125              | M12-1     | 65mm          | 22 AWG x 1m BBB |               |
| GS100201 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 105              | -40 to 105              | M18-1     | 65mm          |                 | 12mm circular |
| GS100202 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 125              | -40 to 125              | M18-1     | 65mm          | 22 AWG x 1m BBB |               |
| GS100203 | 5 to 24                       | 20                     | 2-wire leads | —                                 | —                      | -40 to 125              | -40 to 125              | M18-1     | 65mm          | 20 AWG x 1m BBB |               |
| GS100301 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 105              | -40 to 105              | 5/8" - 18 | 2.56"         |                 | 12mm circular |
| GS100302 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 125              | -40 to 125              | 5/8" - 18 | 2.56"         | 20 AWG x 1m BBB |               |
| GS100303 | 5 to 24                       | 20                     | 2-wire leads | —                                 | —                      | -40 to 125              | -40 to 125              | 5/8" - 18 | 2.56"         | 20 AWG x 1m BBB |               |
| GS100401 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 105              | -40 to 105              | 3/4" - 16 | 2.56"         |                 | 12mm circular |
| GS100402 | 4.5 to 24                     | 6                      | sink         | 700                               | 25                     | -40 to 125              | -40 to 125              | 3/4" - 16 | 2.56"         | 22 AWG x 1m BBB |               |
| GS100403 | 5 to 24                       | 20                     | 2-wire leads | —                                 | —                      | -40 to 125              | -40 to 125              | 3/4" - 16 | 2.56"         | 20 AWG x 1m BBB |               |

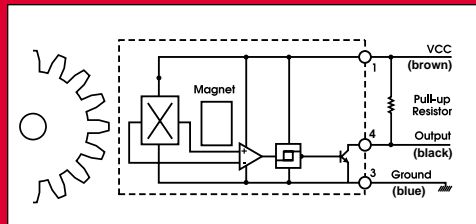
GS1005-1009  
Commercial-Grade



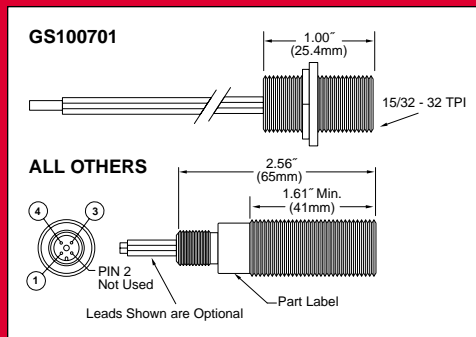
Commercial-grade, Hall effect geartooth speed sensor with adjustable aluminum housing.

- Sense Motion of Ferrous Geartooth Targets
- Near Zero Speed Sensing Capability
- Immune From Hostile Environments
- Not Subject to Rotational Orientation
- High-Speed Capability
- Operate From 5 to 24Vdc
- Reverse Battery Protection to -24Vdc
- Wide Operating and Storage Temperature Range

Open Collector Sinking Block Diagram



Dimensions



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Housing       | Thread    | Barrel Length | Leads           | Connector     |
|----------|-------------------------------|------------------------|--------|-----------------------------------|------------------------|-------------------------|-------------------------|---------------|-----------|---------------|-----------------|---------------|
| GS100501 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 105              | -40 to 105              | Alum. (red)   | M12-1     | 65mm          |                 | 12mm circular |
| GS100502 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | Alum. (red)   | M12-1     | 65mm          | 20 AWG x 1m BBB |               |
| GS100601 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 105              | -40 to 105              | Alum. (red)   | M18-1     | 65mm          |                 | 12mm circular |
| GS100602 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | Alum. (red)   | M18-1     | 65mm          | 20 AWG x 1m BBB |               |
| GS100701 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | Alum. (black) | 15/32"-32 | 1.00"         | 20 AWG x 1m BBB |               |
| GS100801 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 105              | -40 to 105              | Alum. (black) | 5/8" - 18 | 2.56"         |                 | 12mm circular |
| GS100802 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | Alum. (black) | 5/8" - 18 | 2.56"         | 20 AWG x 1m BBB |               |
| GS100901 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 105              | -40 to 105              | Alum. (black) | 3/4" - 16 | 2.56"         |                 | 12mm circular |
| GS100902 | 4.5 to 24                     | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | Alum. (black) | 3/4" - 16 | 2.56"         | 20 AWG x 1m BBB |               |

GS Series Notes

- A: For sensors with integral connectors, mating cordsets are available from Cherry. Request Part Number AS000203 for a straight female connector or AS000204 for a right-angle female connector.
- B: For further information, visit [www.cherrycorp.com](http://www.cherrycorp.com).
- C: See page 14 for interface recommendations.

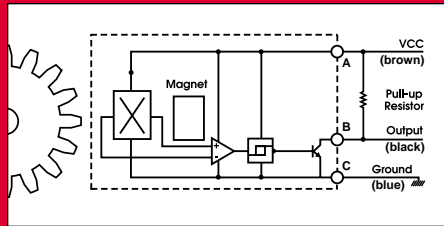
GS1012 Plastic Housing With Mounting Flange



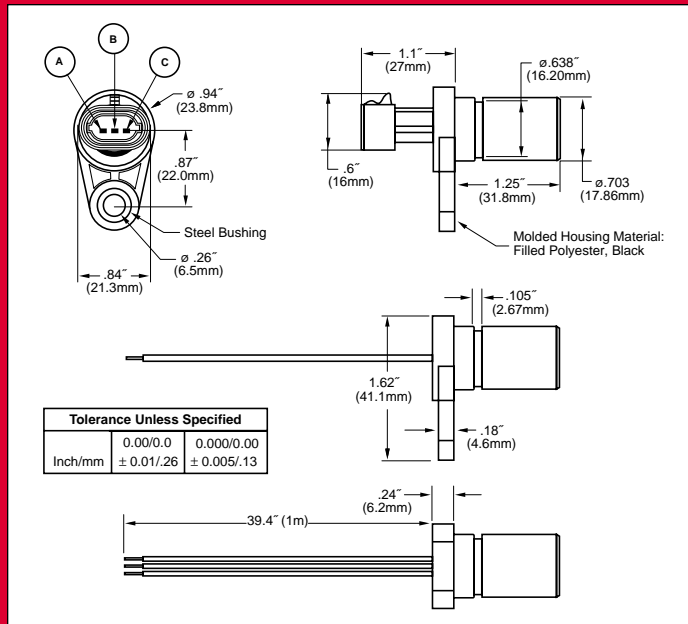
**Hall effect geartooth speed sensor with flange-style plastic housing.**

- Sense Motion of Ferrous Geartooth Targets
- Near-Zero Speed Sensing Capability
- Immune From Hostile Environments
- Not Subject to Rotational Orientation
- High-Speed Capability
- Operate From 5 to 24Vdc
- Reverse Battery Protection to -24Vdc
- Wide Operating and Storage Temperature Range
- Meet all IEC (International Electrotechnical Commission) Requirements for Heavy Industrial Environments, Assuring Immunity From:
  - Electrostatic Discharge
  - Electrical Transients
  - Radiated Electric Field
  - Conducted Energy
  - Magnetic Field Energy

**Open Collector Sinking Block Diagram**



**Dimensions**



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Leads           | Connector |
|----------|-------------------------------|------------------------|--------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------------|-----------|
| GS101201 | 5 to 24                       | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              |                 | Delphi*   |
| GS101202 | 5 to 24                       | 6                      | sink   | 400                               | 25                     | -40 to 125              | -40 to 125              | 22 AWG x 1m BBB |           |

\*Metripak 150 series. Mates with Delphi 12162280 and 12162279. A mating connector assembly with one meter of wire is available from Cherry. Request part number AS000101.

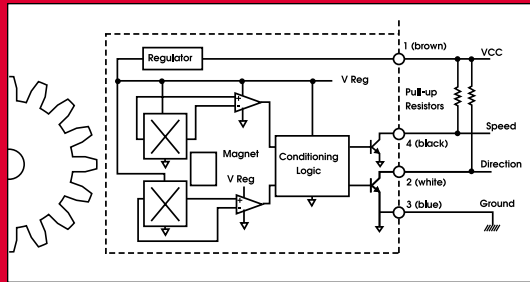
SD1002-1004 Speed and Direction Sensor



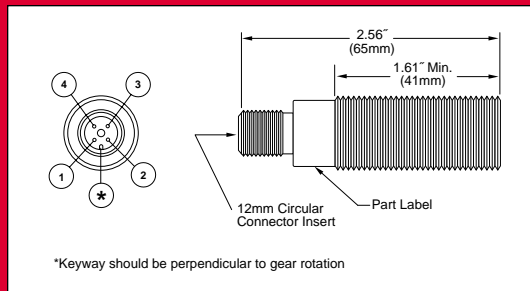
**Hall effect geartooth speed and direction sensor with adjustable stainless steel housing.**

- Sense Motion/Direction of Ferrous Geartooth Targets
- Separate Digital Outputs for Speed and Direction
- Immune From Hostile Environments
- High-Speed Capability
- Operate From 5 to 24Vdc
- Reverse Battery Protection to -24Vdc
- Wide Operating and Storage Temperature Range
- M12 Integral Connector Meets IEC60947-5-2
- Meet all IEC (International Electrotechnical Commission) Requirements for Heavy Industrial Environments, Assuring Immunity From:
  - Electrostatic Discharge
  - Electrical Transients
  - Radiated Electric Field
  - Conducted Energy
  - Magnetic Field Energy

**Open Collector Sinking Block Diagram**



**Barrel Dimensions**



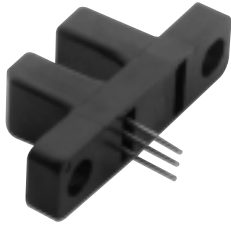
| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Housing | Thread    | Barrel Length |
|----------|-------------------------------|------------------------|--------|-----------------------------------|------------------------|-------------------------|-------------------------|---------|-----------|---------------|
| SD100201 | 4.75 to 24                    | 17                     | sink   | 400                               | 25                     | -40 to 85               | -40 to 105              | SST     | M18-1     | 65mm          |
| SD100401 | 4.75 to 24                    | 17                     | sink   | 400                               | 25                     | -40 to 85               | -40 to 105              | SST     | 3/4" - 16 | 2.56"         |

**GS and SD Series Notes**

- A: For sensors with integral connectors, mating cordsets are available from Cherry. Request Part Number AS000203 for a straight female connector or AS000204 for a right-angle female connector.
- B: For further information, visit [www.cherrycorp.com](http://www.cherrycorp.com).
- C: See page 14 for interface recommendations.



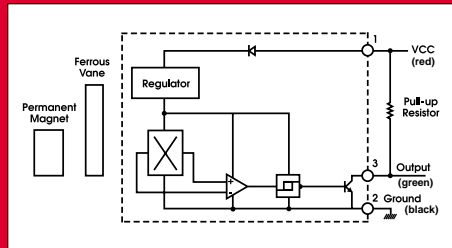
VN1015 Digital Vane Switch



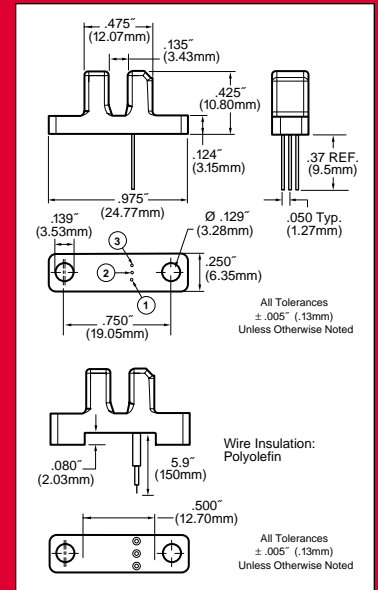
Magnetically-activated digital vane switch in a rugged, overmolded plastic housing with three pins or 3-wire harness.

- Available in Two Operating Temperature Ranges
- Immune From Moisture and Dust
- Reliable and Repeatable
- No Mechanical Contacts to Wear Out
- Operate From 5 to 24VDC
- Reverse Battery Protection to -24VDC
- Open Collector Output Compatible With All Logic Families
- Sensor Body Material: Glass-Filled Polyester
- Recommended Vane Parameters
  - Material: Low-carbon, Cold-rolled Steel
  - Minimum Dimensions: 0.40" Thick, 0.250" Wide
  - Vane should penetrate to a depth less than 0.120" from bottom of sensor slot.

Open Collector Sinking Block Diagram



Dimensions

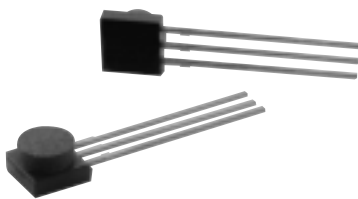


| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output      | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Termination          |
|----------|-------------------------------|------------------------|-------------|-----------------------------------|------------------------|-------------------------|-------------------------|----------------------|
| VN101501 | 4.5 to 24                     | 6                      | 3-pin sink  | 400                               | 25                     | -40 to 85               | -40 to 85               | pins                 |
| VN101502 | 5 to 24                       | 6                      | 3-pin sink  | 400                               | 25                     | -40 to 125              | -40 to 125              | pins                 |
| VN101503 | 4.5 to 24                     | 6                      | 3-wire sink | 400                               | 25                     | -40 to 85               | -40 to 85               | 24 AWG x 150mm leads |
| VN101504 | 5 to 24                       | 6                      | 3-wire sink | 400                               | 25                     | -40 to 125              | -40 to 125              | 24 AWG x 150mm leads |

H E 3 1 3 5

L A T C H A S S E M B L Y

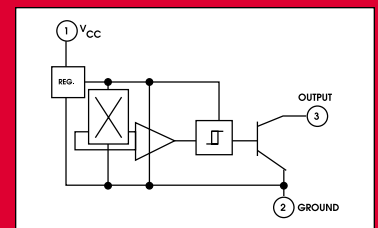
HE3135 Hall Effect Latch Assembly



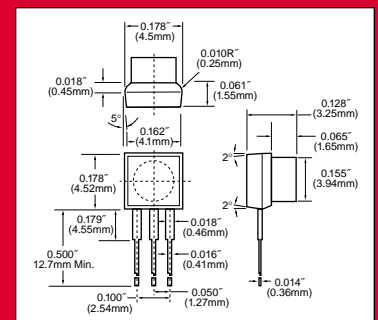
Magnetically-biased bipolar digital latch for use with multipole ring magnets.

- Offers Extreme Sensitivity
- Reliable — No Moving Parts to Wear Out
- Compact Size
- Output Compatible with All Digital Logic Families
- Symmetrical Output
- Latches in Presence of a South Pole and Unlatches in Presence of a North Pole

Sinking Block Diagram



Dimensions



| Part #   | Operating Voltage Range (VDC) | Supply Current, mA max | Output | Output Saturation Voltage, mV max | Output Current, mA max | Operate Temp. Range, °C | Storage Temp. Range, °C | Termination           |
|----------|-------------------------------|------------------------|--------|-----------------------------------|------------------------|-------------------------|-------------------------|-----------------------|
| HE313500 | 4.5 to 24                     | 9                      | sink   | 400                               | 25                     | -20 to 85               | -40 to 105              | Straight Terminals    |
| HE313501 | 4.5 to 24                     | 9                      | sink   | 400                               | 25                     | -20 to 85               | -40 to 105              | Right-Angle Terminals |

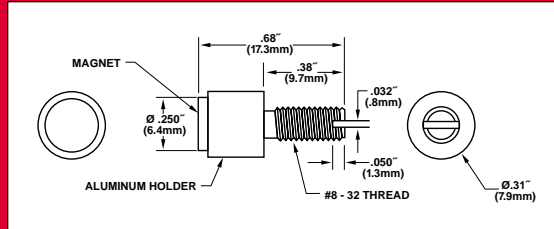
AS101001 Actuator Magnet



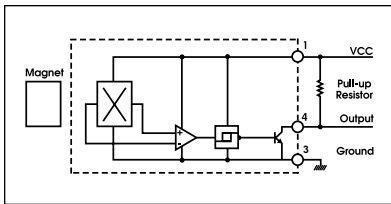
**Easy-to-install actuator magnet with threaded aluminum holder.**

- Rugged Aluminum Housing
- Adjustable Threaded Mounting Stud
- Operating and Storage Temperature: -40° to +150°C
- South Pole Facing Alnico Magnet

**Dimensions**



GENERAL NOTES

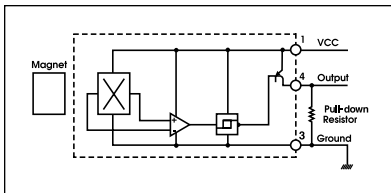


**3-Wire Sinking Interface**

Sinking outputs are often used in negative logic applications, where a low signal is required for an active state. Therefore, sinking outputs normally have current flowing into the device output lead when the device is active. Also called "open collector outputs," sinking outputs are compatible with any logic family since a wide voltage range may be used for  $V_{CC}$ . Furthermore, the voltage level used to power the Hall effect assembly may differ from the pull-up resistor to which it is attached. The external pull-up resistor connected between the output and  $V_{CC}$  is required for proper operation. With the resistor connected as shown, the output will be "pulled up" to  $V_{CC}$  when off and (approximately) to ground when on.

Recommended pull-up resistor values are as follows:

|          |     |     |      |      |      |
|----------|-----|-----|------|------|------|
| Volts dc | 5   | 9   | 12   | 15   | 24   |
| Ohms     | 470 | 820 | 1.2K | 1.5K | 2.2K |

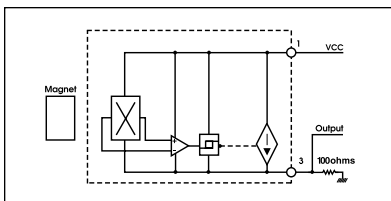


**3-Wire Sourcing Interface**

Sourcing outputs are often used in positive logic applications, where a high signal is required for an active state. Thus, sourcing outputs normally have current flowing out of the device output lead when the device is active. Because a pull-down resistor is required for proper operation, sourcing outputs are compatible with CMOS logic, but not with TTL components. With the pull-down resistor connected as shown, the output will be "pulled down" to ground when off and (approximately) to  $V_{CC}$  when on.

Recommended pull-down resistor values are as follows:

|          |     |     |      |      |      |
|----------|-----|-----|------|------|------|
| Volts dc | 5   | 9   | 12   | 15   | 24   |
| Ohms     | 470 | 820 | 1.2K | 1.5K | 2.2K |



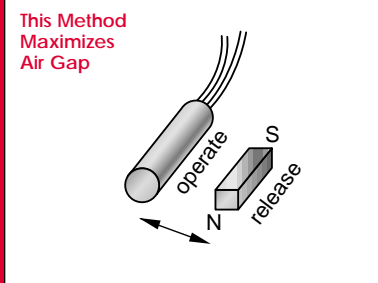
**2-Wire Current Sourcing Interface**

Some applications require the sensor have only two connections. To accommodate these situations, several Cherry sensor assemblies are equipped with a 2-Wire interface (which may be tested as shown in the block diagram). When the sensor is idle, current flowing into the device via Pin 1 and out via Pin 3 is limited to that needed to power the Hall effect device, a maximum of 6mA. When the sensor is active, the current flow will increase to a minimum of 10mA as the Hall effect device turns on the programmable current source. The voltage measured between the output and ground will therefore change by a minimum of 0.4 Vdc. If Pin 3 is connected to a comparator, the comparator output will switch in response to the change in voltage at Pin 3 of the sensor. Alternatively, Pin 3 can be connected directly to ground and a load placed between Pin 1 and  $V_{CC}$ . In this case, Pin 1 becomes the output lead to be connected to a comparator.

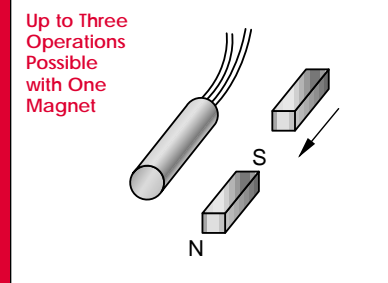
MP Series Reed Sensors

A Reed Sensor is an omnipolar, magnetically activated switch. It can be approached by a magnet from any angle, with either pole. Several possible operating methods are shown below.

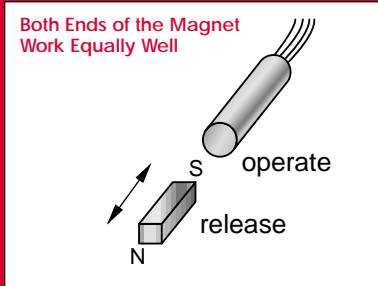
Perpendicular Magnet Travel



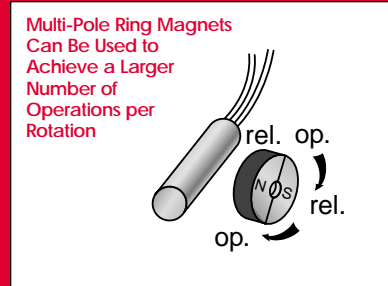
Parallel Magnet Travel



Nose-To-Nose Activation



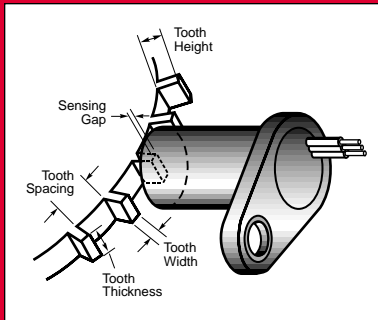
Rotational Magnet Travel



Operating a Speed Sensor

Although commonly called a geartooth sensor, a solid-state speed sensor can detect the motion of various ferrous objects with some type of discontinuous surface.

Solid-State Speed Sensor



Examples of appropriate targets include:

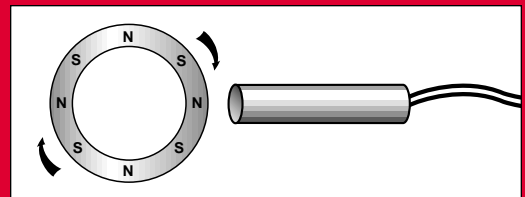
- Sprockets
- Bolt Heads
- Roller Chains
- Cavities in a Smooth Surface

For best results, we recommend targets made from low carbon cold rolled steel. Other factors that influence sensor performance include geartooth height and width, space between teeth, shape of the teeth and thickness of the target. As a general guideline, consider a target with the following minimum parameters:

| Tooth Height | Tooth Width | Distance Between Teeth | Target Thickness |
|--------------|-------------|------------------------|------------------|
| .200"        | .100"       | .400"                  | .250"            |

Cherry's solid-state magnetic proximity sensors also make excellent speed sensors when coupled with a rotating ring magnet. Advantages of this approach include: lower sensor cost, larger airgaps and absolute zero-speed sensing.

Proximity Sensor with Ring Magnet



In addition to the speed and proximity sensors presented here, Cherry also offers a complete line of standard and semi-custom snap-action, selector and key switches. With over 10,000 product variations and complete design, prototype and production capabilities, Cherry has the right solution for all your electromechanical and electronic switching needs.

For complete technical information on all of our sensor and switch products, as well as our general purpose and advanced performance keyboards, contact Cherry today.



**Cherry Electrical Products**

Phone: 800-285-0773 (Sensors)  
262-942-6500 (General)  
Fax: 262-942-6566  
Web: [www.cherrycorp.com](http://www.cherrycorp.com)

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