

# Gear Tooth Speed Sensors

## GS1005 – GS1007 Sensors

Hall Effect gear tooth speed sensor  
with adjustable anodized aluminum housing



### Description

The GS1005-GS1007 series gear tooth speed sensors are Hall Effect devices designed for use in applications where ferrous edge detection/near zero speed sensing is needed. They provide a sinking current output.

### Features

- From near zero speed up to 15 kHz sensing capability
- 10 bit dynamic threshold direction offers:
  - Automatically adjusting magnetic range
  - Self-compensating to target geometry
- Compatible with unregulated power supply
- RoHS compliant
- IP67
- Typical air gap of 1.5 mm\*

### Typical Applications

- Speedometers
- Anti-lock braking systems
- Exercise equipment
- CNC machine tools

PLEASE NOTE

CHERRY  
will become  
ZF in 2017.



### Environmental Specifications

|  |  |
|--|--|
| Vibration                                  | Sinusoidal, 15 g max from 40 Hz to 2 kHz |
| Mechanical Shock Resistance                | 50 g                                     |
| Maximum Speed Detection                    | 15 kHz                                   |
| Operating Temperature (GS100501)           | -40 °C to 105 °C (-40 °F to 221 °F)      |
| Operating Temperature (GS100502, GS100701) | -40 °C to 125 °C (-40 °F to 257 °F)      |
| Storage Temperature                        | -40 °C to 125 °C (-40 °F to 257 °F)      |
| Ingress Protection                         | IP67                                     |

### Electrical Specifications

|                              |                     |
|------------------------------|---------------------|
| Operating Supply Voltage     | 5 to 24 VDC         |
| Maximum Input Voltage        | 30 VDC              |
| Maximum Reverse Voltage      | 24 VDC              |
| Supply Current               | 3 mA typ., 6 mA max |
| Output Sink Current          | 20 mA max           |
| Recommended Pull-Up Resistor | See chart           |

### Mechanical Specifications

|   |                               |
|---|-------------------------------|
| Housing Material                            | Anodized Aluminum             |
| Maximum Installation Torque Limit           | 5.65 Nm (50 in lb) on threads |
| Operating Air Gap / Sensing Distance*       | 1.5 mm (0.06")                |
| * With recommended target type; see drawing |                               |
| Sensor Orientation                          | Not sensitive                 |

### Products

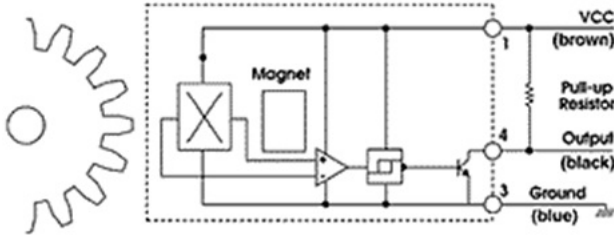
| Part Number | Thread    | Leads        | Connector  |
|-------------|-----------|--------------|--|
| GS100501    | M12-1     |              | 12 mm, 4-pin circular mating connector, type IEC 60947-5-2 |
| GS100502    | M12-1     | 20 AWG x 1 m |  |
| GS100701    | 15/32"-32 | 20 AWG x 1 m |  |

Note: An external pull-up resistor is required, the value of which is dependent on the supply voltage. The resistor should be connected between the output and Vcc. Refer to the wiring diagram for lead colors or pin numbering as applicable.

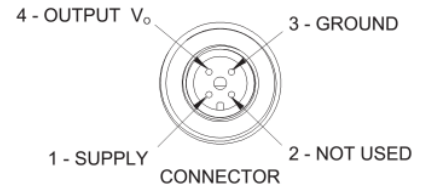
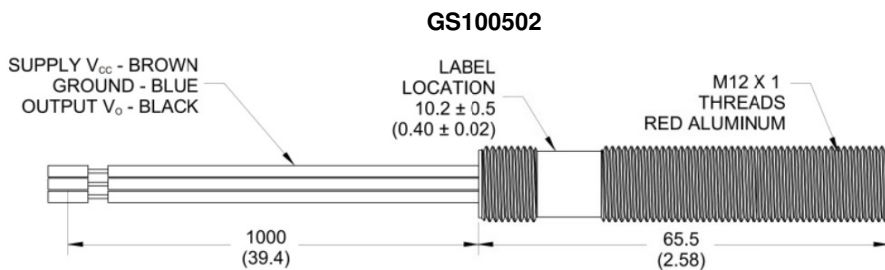
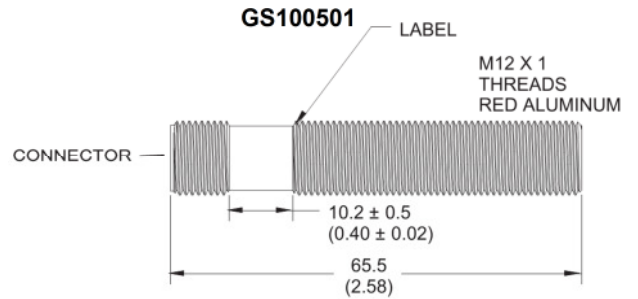
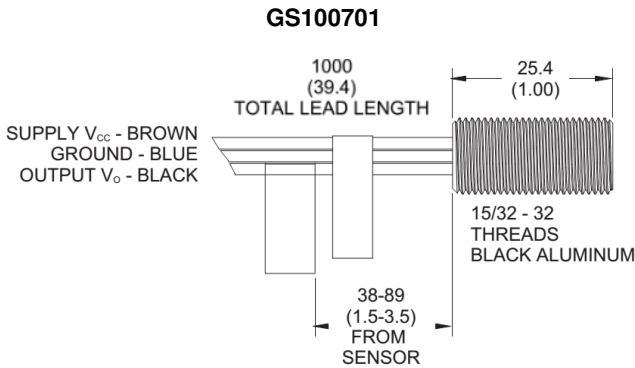
### Recommended External Pull-Up Resistor

|          |    |      |      |    |    |
|----------|----|------|------|----|----|
| Volts DC | 5  | 9    | 12   | 15 | 24 |
| Ohms     | 1k | 1.8k | 2.4k | 3k | 3k |

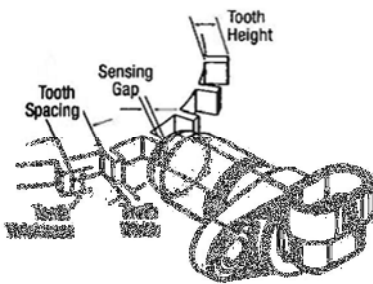
### Open Collector Sinking Block Diagram



### Dimensions mm (inches)



### Installation



For best results, we recommend targets made from low carbon cold rolled steel. Other factors that influence sensor performance include gear tooth height and width, space between the teeth, shape of the teeth and thickness of the target. As a general guideline, consider a target with minimum parameters as shown below. Note that smaller dimensions may work, but testing for the application is required.

| Tooth Height   | Tooth Width    | Distance between Teeth | Target Thickness |
|----------------|----------------|------------------------|------------------|
| 5.0 mm (.200") | 2.5 mm (.100") | 10 mm (.400")          | 6.35 mm (.250")  |

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