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

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 ºC to 105 ºC (-40 ºF to 221 ºF)
Operating Temperature (GS100502, GS100701)	-40 °C to 125 ºC (-40 ºF to 257 ºF)
Storage Temperature	-40 ºC to 125 ºC (-40 ºF to 257 ºF)
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* * With recommended target type; see drawing	1.5 mm (0.06")
Sensor Orientation	Not sensitive

Products

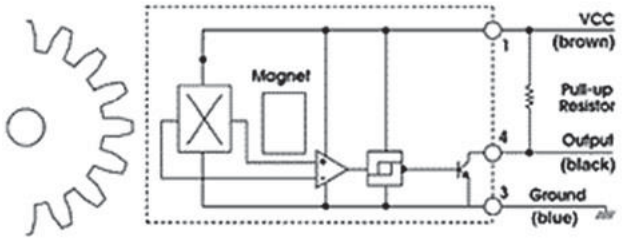
Part Number	Thread	Leads	Connector
GS100501	M12-1		12 mm, 4-pin circular mating connector, type IEC 60947-5-2
GS100502	M12-1	20 AWG x 1 m	
GS100701	15/32"-32	20 AWG x 1 m	

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

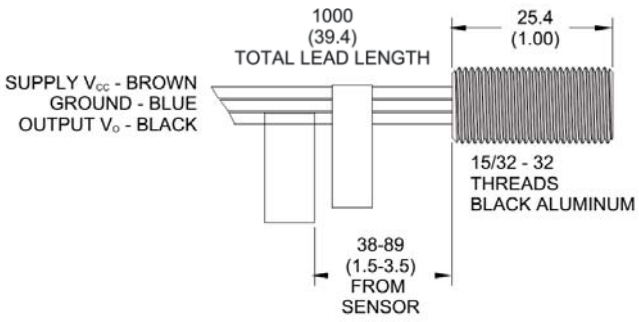
Volts DC	5	9	12	15	24
Ohms	1k	1.8k	2.4k	3k	3k

Open Collector Sinking Block Diagram

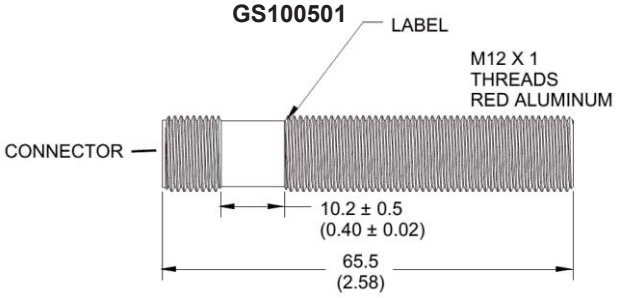


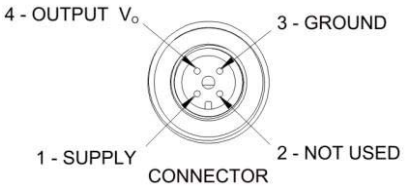
Dimensions mm (inches)

GS100701

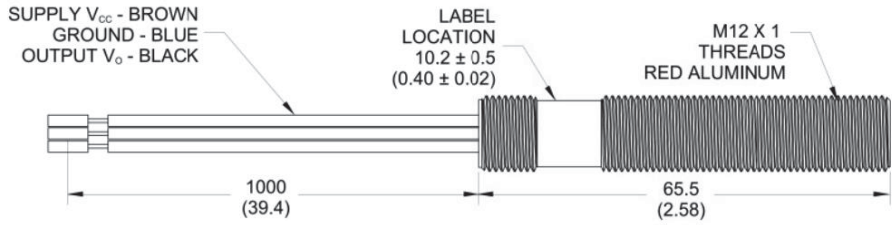


GS100501

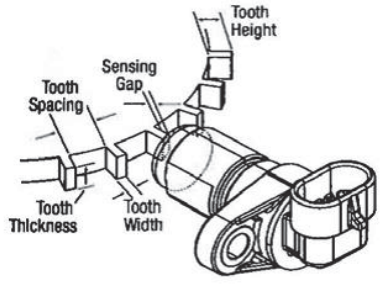




GS100502



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")