Hyzon Speed & Direction Sensor

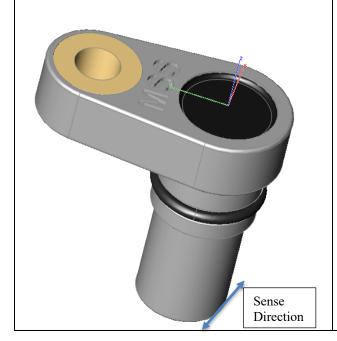
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Differential Magnetic Speed and Direction Sensors

Description

This sensor uses a Back Biased differential Hall Effect device to measure the passing teeth of a ferrous target. The sensor face must be oriented such that, the bolt hole is in line with the direction of rotation.

The device uses an industry standard 2 level current output (nominals: 7mA and 14mA).



Features and Benefits

- Senses motion of a ferrous object, no additional magnet(s) need to be added
- 2-wire Current output
- Extremely small size (Body: OD:13.75mm x L:38mm), and 38mm flange
- Very Immune to EMC
- True Zero Speed
- AGC (Automatic Gain Control)
- AOA (Automatic Offset Adjust)
- Under voltage Lockout

Absolute Maximum Ratings

Characteristics	Symbol	Notes	Rating	Units
Forward Supply	Vcc		28	V
Voltage				
Reverse-Supply	Vrcc		-18	V
Voltage				
Operating Ambient	Ta		-40 to 150	С
Temp				

Electrical Characteristics

Characteristics	Symbol	Test Condition	Min	Тур	Max.	Units
Supply Voltage	Vcc	T<=150C	4.0	-	24	V
Undervoltage Lockout	Vcc(uv)	Vcc, 0-5 or 5-0	-	3.6	3.95	V

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Reverse Supply	Ircc	Vcc = Vrcc(max)	-	-	-10	mA
Current						
Supply Zener Clamp	Vzs	$Icc = Icc_max + 3mA,$	28	-	-	V
Voltage		Ta=25C				
Supply Zener Current	Icc	Ta=25C, Vcc=28V	-	-	19	mA
Chopping frequency	Fc	Ta =25C	-	400	-	kHz
Bypass Capacitance		Vcc to GND	-	2200	-	pF

Output Characteristics

Characteristics	Symbol	Test Condition	Min	Тур	Max.	Units
Power-on State	POS	Vcc > Vcc(min)	-	Icc(Low)	-	-
Power-on time	tpo	Time from Vcc>Vcc(min)	-	-	1	mS
		to calibration start				
Supply Current	Icc(low)	Low-Current State	5.9	7	8.0	mA
	Icc(High)	High-current state	12	14	16	mA
Supply Current Ratio	Icc(High)/Icc	Measured as a ratio of High	1.9	-	-	-
	(Low)	current to low current				
Output Rise time	Tr	Output slew rate, Rl= 100Ω	0	2	4	uS
Output Fall time	Tf	Output slew rate, Rl= 100Ω	0	2	4	uS

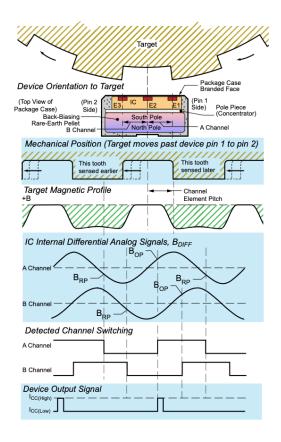
Operating Characteristics

Characteristics	Symbol	Test Condition	Min	Тур	Max.	Units
Operate Point	Bop	% of Pk-Pk, normalized	-	670	-	%
		internal signal				
Release Point	Brp	% of Pk-Pk, normalized	-	30	-	%
		internal signal				
Operating Differential	Bdiff(pk-pk)		30	-	-	G
Magnetic Input						
Operating Frequency	F_fwd	Narrow Option	0	ı	12	kHz
Operating Frequency	F_rev	Narrow Option	0	ı	7	kHz
Operating Frequency	F_ND	Narrow Option	0	ı	4	kHz
Allowable	Bseq		0.7	-	1.3	-
Differential						
Sequential Signal						
Variation						
Pulse Width Forward		Narrow Option	38	45	52	μS
Pulse Width Reverse		Narrow Option	76	90	104	μS
Pulse Width non-		Narrow Option	153	180	201	μS
direction						

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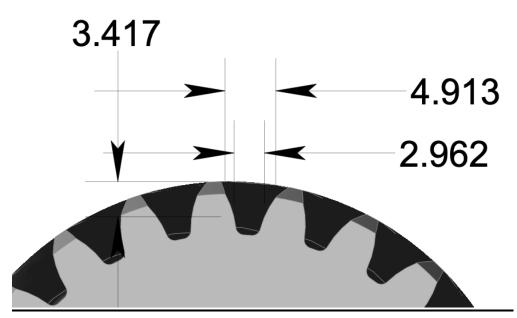
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Sensing Configuration:



Target Geometry:

A nominal 4.0mm wide teeth and valleys should be used as well as at least 4mm of valley depth. Hyzon Target example below is acceptable.



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Pin-out

Red = VccWhite = Vout

Circuit Example:

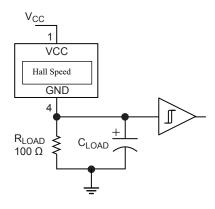
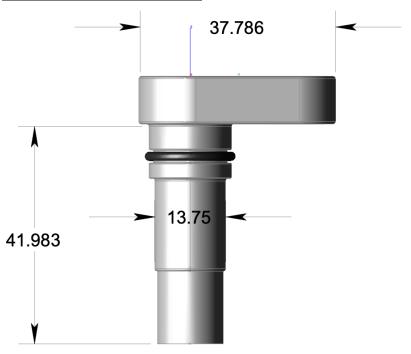


Figure 1: Typical Application Circuit

Base dimensions

(Speed and Direction Sensor)



V1.1

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Appendix A: Setting choices. This Product uses: -FSNHPYUE-A

Configuration Options **ASIL Protocol:** -A - ASIL protocol enabled [blank] - ASIL protocol disabled **Magnetic Temperature Compensation:** E - 0.16%/°C G-0.04%/°C Extended Sudden Air Gap: K - Timed resets enabled U - Feature not enabled **Calibration Mode Non-Direction Pulses:** O - Blanked, no output during Calibration Y - Pulses allowed during Calibration **Running Mode Non-Direction Pulses:** B - Blanked, no output during Running mode P - Pulses allowed during Running mode Vibration Immunity / Direction Change: L - Low vibration immunity with immediate direction change detection H - High vibration immunity Pulse Widths (Typical): I – Intermediate, Forward = 60 μs, Reverse = 120 μs, Non-Direction = 30 μs N-Narrow, Forward = 45 μs , Reverse = 90 μs , Non-Direction = 180 μs W –Wide, Forward = 45 μ s, Reverse = 180 μ s, Non-Direction = 360 μ s **Number of Pulses:**

F - Forward, pin 1 to pin 2

Rotation Direction:

S - Single, one pulse per magnetic pole pair

 $R-Forward,\,pin\;2\;to\;pin\;1$