

AH-Series Hall Gear Sensors

● Product Introduction

The Series AH Gear Sensor is a self-adjust gear speed sensor that monitors the movement of titanium-like metals using a Hall chip internally biased with a magnet and the output is in the form of a digital sinking current output (open collector). There is only a single Hall element in the sensor, so alignment problems are out of concern. The Hall chip and its circuit are sealed in a metal housing in the form of a probe, which can effectively avoid electromagnetic interference and moisture. It has a better SNR than electromagnetic induction sensors and excellent low-speed performance to achieve "zero-speed" detection. Currently, the sensors are widely used in the following fields.

Automotive

- Camshaft and Crankshaft speed / position detection
- Transfer speed detection
- Speedometer
- Anti-lock brake system (ABS system)

Industry

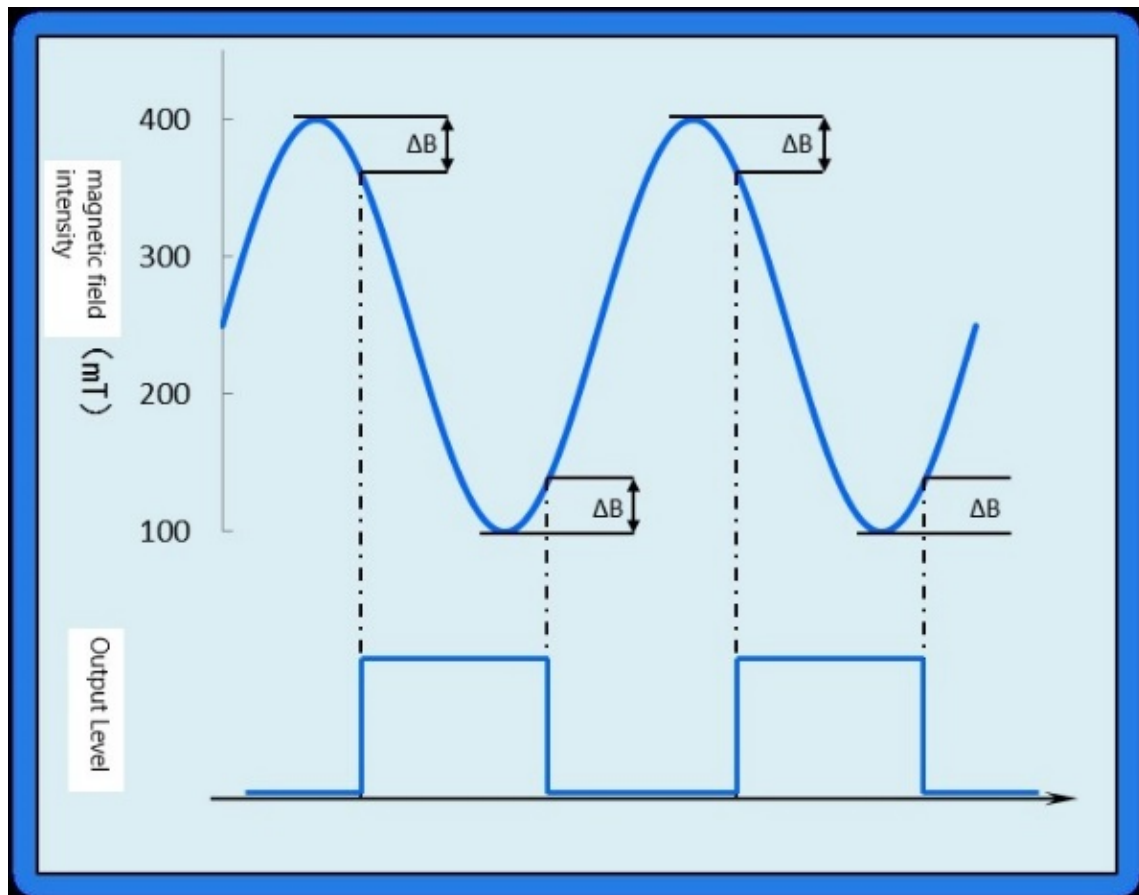
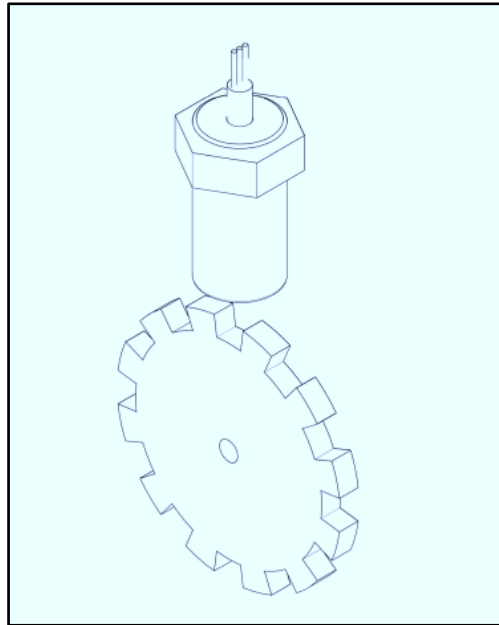
- Sprocket gear speed detection
- Speed and distance detection on chain conveyor belts
- Stop motion detection
- High-speed, low-cost proximity switches

● Principle

The sensor is designed to sense changes in the magnetic field, so the output state is changed when the magnetic flux density reaches a certain value. In other words, the mounting position of the sensor must be adjusted for different gears so that the amount of change in magnetic field strength sensed by the Hall chip in the product can be ensured to meet the operating conditions.

When the external gear rotates, the magnetic field strength sensed by the Hall chip decreases from the maximum value, and the sensor output state changes from low to high, and it changes into high level when the absolute value of increment ΔB is greater than 100Gs; while the sensor output state

changes from high to low when the magnetic field strength increases from a very small value and it changes into low level when the absolute value of increment ΔB is greater than 100Gs.



- Product Parameters

Parameter		Test Condition	Min.	Typ.	Max.	Unit	
Electrical Characteristics	Supply Voltage (Vcc)	-	5	12	24	V	
	Low-level Output Voltage (VOL)	single output (A)	Vcc=5.0~24V		50	200	mV
		Complementary output (B)			5	50	
	High-level Output Voltage (VOH)	single output (A)	Vcc=5.0~24V	Vcc-0.2	Vcc-0.3	Vcc-0.5	V
		Complementary output (B)		3±0.2	6±0.2	6±0.2	
	Load Current (Io)		Vcc=5.0~24V	2	3	8	mA
	Frequency Range (f)		Vcc=5.0~24V	-	2	-	kHz
	Switching Time	Output-Rise Time (Tr)	Vcc=12V	-	600	-	ns
Output-Fall Time (Tf)		-		500	-		
Absolute Maximum Ratings	Supply Voltage (Vs)		30			V	
	Output Voltage (Vout)		30			V	
	Supply Current (IDD)		50			mA	
	Output Current (Iout)		30			mA	
	Temperature Range	Storage	-40~+150			°C	
		Operating	-40~+125			°C	
Switch	Bias (Bbias)		Vcc=12V	-	110	-	mT
	Release (Bor)		Vcc=12V	100	175	220	mT
	Hysteresis (Bhy)		Vcc=12V	8	65	100	mT

Note: All specifications were obtained at TA=25°C, 4.2k pull-up resistance; 1mT=10Gs.

* The absolute maximum specification may work and the sensor will not be damaged, but the sensing performance will change. If the absolute maximum specifications are exceeded, the sensor may be damaged.

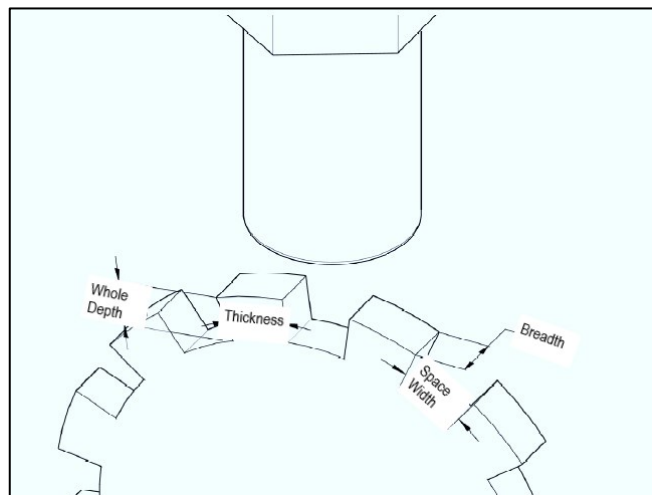
Products can be customized according to technical requirements.

● User Guide

The application of the sensor is not limited to a specific target. As a general guideline, consider a target with minimum parameters as shown below within a sensing distance of 2 mm.

- (1) When the sensor is mounted and used, the working distance should be properly adjusted to the optimum.
- (2) When the sensor is mounted, the sensor should be rotated appropriately to obtain the best trigger point.
- (3) The optimal performance depends on several factors listed below that must be considered together.
 - ✧ The material, shape, and velocity of the target object
 - ✧ The gap between the sensor and object
 - ✧ Ambient Temperature
 - ✧ Magnetic material when closing it.

Parameter	Reference Values
Gear Thickness (s)	a
Space Width (e)	b
Whole Depth (h)	c
Breadth (b)	d

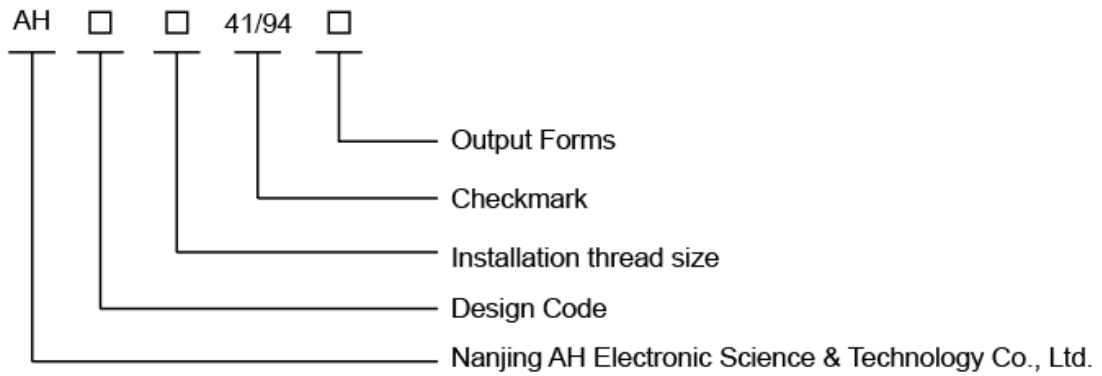


Model	a	b	c	d
AH-ZS081-94A	6	5.03	6	6.28
AH-ZS121-94A	6	5.03	6	6.28
AH-ZS181-94A	6	6.98	10	10.47
AH-ZS182-41A	6	6.98	10	10.47
AH-ZS182-41B	6	6.98	10	10.47
AH-Q182-41A	6	2.98	3	3.14
AH-T181-41A	6	2.98	3	3.14
AH-T192-41A	6	5.03	6	6.28

● Selection Table

Model	Picture	Dimension (Unit:mm)
AH-ZS081-94A		
AH-ZS121-94A		
AH-ZS181-94A		
AH-ZS182-41A		
AH-ZS182-41B		
AH-Q182-41A		
AH-T181-41A		
AH-T192-41A		

- Marking Information



- Output Forms:
 - A: single output
 - B: complementary outputs
- Installation thread size:
 - Diameter: 08 - M8; 12 - M12; 18 - M18; 19 - M19
 - Pitch: 0 - non-threaded; 1 - 1.0mm; 2 - 1.5mm
- Design Code:
 - ZS: tachometer
 - Q: crankshaft
 - T: camshaft
 - LS: wheel speed detection