

## Hall Effect Sensors

AI-Tek has taken its years of experience of designing and manufacturing Hall Effect sensors for engine timing applications and has developed a line of durable products for industrial use.

With multiple standard variations we offer the widest range of standard catalog sensors to meet your various design needs. The design is flexible to easily meet all of your application requirements.

The Hall Effect sensor can sense each change in target movement, regardless of speed, from near zero to 15 kHz frequency range, generating a steady pulse train of frequency proportional to target speed. Typically, each time a gear tooth (or any ferrous discontinuity) passes in front of the sensor the output changes state. This type of sensor is known as a "P" type because it uses N-P-N transistor logic (as opposed to "N" type, which uses P-N-P transistor logic).

Key features to note are:

- Reverse voltage protection, to prevent damage if miswired
- Extended temperature range
- Wide range of supply voltage
- Two output options of Supply Tracking or TTL Compatible
- Rugged design meeting IEC 77 Standards (European Railroad Applications)

AI-Tek has (3) Series of Hall Effect Sensors: RH Series, DH Series and BH Series. Below is a quick reference chart of the features of each of the series.

<b>PERFORMANCE</b>	<b>RH SERIES</b> 1 Output Channel	<b>DH SERIES</b> 1 Output Channel	<b>BH SERIES</b> 2 Output Channels + Direction
Zero speed to 15kHz operation	<b>X</b>	<b>X</b>	<b>X</b>
Standard gear tooth sensing	<b>X</b>	<b>X</b>	<b>X</b>
Fine, 32 DP Capability		<b>X</b>	<b>X</b>
Single tooth / valley target		<b>X</b>	<b>X</b>
No installation alignment	<b>X</b>		
Extended airgap (0.100"+ for 12DP and coarser targets)		<b>X</b>	<b>X</b>
General noise immunity	<b>X</b>	<b>X</b>	<b>X</b>
EMI Hardened		<b>X</b>	<b>X</b>
High tolerance to target run-out		<b>X</b>	<b>X</b>
Self-calibrating		<b>X</b>	<b>X</b>
Direction Sensing			<b>X</b>
Lowest cost	<b>X</b>		

For applications that exceed 500 Ft (150 meters) go to page 42 for the DSDA, (Digital Signal Distance Amplifier).

*It is the customer's responsibility to determine whether the product is proper for customer's use and application.*

# RH & DH Series

## Active Sensor Selection Guide

Thread Size	Part Number	Supply Tracking or TTL	Termination	Thread Length (in)	Sensor Length (in)	Agency Approval	Page
3/4-20	DH1612-113	TTL	Cable	1.5	3.375		34
3/4-20	DH1622-113	ST	Cable	1.5	3.375		34
3/4-20	RH1612-013	TTL	Cable	1.5	3.375		27
3/4-20	RH1622-013	ST	Cable	1.5	3.375		27
3/4-20	DH1612-114	TTL	Cable	2.75	4.625		34
3/4-20	DH1622-114	ST	Cable	2.75	4.625		34
3/4-20	RH1612-014	TTL	Cable	2.75	4.625		27
3/4-20	RH1622-014	ST	Cable	2.75	4.625		27
3/4-20	DH1612-105	TTL	Connector	1.5	3.375		35
3/4-20	DH1622-105	ST	Connector	1.5	3.375		35
3/4-20	RH1612-005	TTL	Connector	1.5	3.375		28
3/4-20	RH1622-005	ST	Connector	1.5	3.375		28
3/4-20	DH1612-106	TTL	Connector	2.75	4.625		35
3/4-20	DH1622-106	ST	Connector	2.75	4.625		35
3/4-20	RH1612-006	TTL	Connector	2.75	4.625		28
3/4-20	RH1622-006	ST	Connector	2.75	4.625		28
3/4-20	DH1612-107	TTL	Connector	4	6.512		35
3/4-20	DH1622-107	ST	Connector	4	6.512		35
3/4-20	RH1612-007	TTL	Connector	4	6.512		28
3/4-20	RH1622-007	ST	Connector	4	6.512		28
3/4-20	DH1612-109	TTL	Wires	1.5	3.375		35
3/4-20	DH1622-109	ST	Wires	1.5	3.375		35
3/4-20	RH1612-009	TTL	Wires	1.5	3.375		28
3/4-20	RH1622-009	ST	Wires	1.5	3.375		28
3/4-20	DH1612-110	TTL	Wires	2.75	4.625		35
3/4-20	DH1622-110	ST	Wires	2.75	4.625		35
3/4-20	RH1612-010	TTL	Wires	2.75	4.625		28
3/4-20	RH1622-010	ST	Wires	2.75	4.625		28
3/4-20	RH1612-025	TTL	Cable	1.375	4.75	X	29
3/4-20	RH1612-026	TTL	Cable	1.5	3.375	X	29
3/4-20	RH1622-026	ST	Cable	1.5	3.375	X	29
3/4-20	RH1612-027	TTL	Cable	2.75	4.625	X	29
3/4-20	RH1622-027	ST	Cable	2.75	4.625	X	29

# RH & DH Series

## Active Sensor Selection Guide

Thread Size	Part Number	Supply Tracking or TTL	Termination	Thread Length (in)	Sensor Length (in)	Agency Approval	Page
5/8-18	DH1512-113	TTL	Cable	1.5	3.375		34
5/8-18	DH1522-113	ST	Cable	1.5	3.375		34
5/8-18	RH1512-013	TTL	Cable	1.5	3.375		27
5/8-18	RH1522-013	ST	Cable	1.5	3.375		27
5/8-18	DH1512-114	TTL	Cable	2.75	4.625		34
5/8-18	DH1522-114	ST	Cable	2.75	4.625		34
5/8-18	RH1512-014	TTL	Cable	2.75	4.625		27
5/8-18	RH1522-014	ST	Cable	2.75	4.625		27
5/8-18	DH1512-105	TTL	Connector	1.5	3.375		35
5/8-18	DH1522-105	ST	Connector	1.5	3.375		35
5/8-18	RH1512-005	TTL	Connector	1.5	3.375		28
5/8-18	RH1522-005	ST	Connector	1.5	3.375		28
5/8-18	DH1512-106	TTL	Connector	2.75	4.625		35
5/8-18	DH1522-106	ST	Connector	2.75	4.625		35
5/8-18	RH1512-006	TTL	Connector	2.75	4.625		28
5/8-18	RH1522-006	ST	Connector	2.75	4.625		28
5/8-18	DH1512-107	TTL	Connector	4	6.512		35
5/8-18	DH1522-107	ST	Connector	4	6.512		35
5/8-18	RH1512-007	TTL	Connector	4	6.512		28
5/8-18	RH1522-007	ST	Connector	4	6.512		28
5/8-18	DH1512-109	TTL	Cable	1.5	3.375		35
5/8-18	DH1522-109	ST	Cable	1.5	3.375		35
5/8-18	RH1512-009	TTL	Cable	1.5	3.375		28
5/8-18	RH1522-009	ST	Cable	1.5	3.375		28
5/8-18	DH1512-110	TTL	Cable	2.75	4.625		35
5/8-18	DH1522-110	ST	Cable	2.75	4.625		35
5/8-18	RH1512-010	TTL	Cable	2.75	4.625		28
5/8-18	RH1522-010	ST	Cable	2.75	4.625		28
5/8-18	RH1512-026	TTL	Cable	1.5	3.375	X	29
5/8-18	RH1522-026	ST	Cable	1.5	3.375	X	29
5/8-18	RH1512-027	TTL	Cable	2.75	4.625	X	29
5/8-18	RH1522-027	ST	Cable	2.75	4.625	X	29
5/8-18	DH1512-210	ST*	Cable	2.75	2.75		36
5/8-18	DH1522-210	ST*	Cable	2.75	2.75		36
3/8-32	RH1320-001	ST	Wires	1.63	1.63		31
3/8-32	RH1320-003	ST	Cable	1.63	1.63		31
3/8-24	RH1320-009	ST	Wires	1.63	1.63		31
3/8-24	RH1320-010	ST	Cable	1.63	1.63		31
3/8-24	RH1320-012	ST	Cable	3	3		31
3/8 Dia	RH1320-005	ST	Wires	—	—		31
3/8 Dia	RH1320-006	ST	Cable	—	—		31

\*NOTE: RTD Temperature Sensing Feature

## RH Series

### Zero Velocity - Magnetic Hall Effect Sensors - 5/8 and 3/4 Threads

#### Specifications

##### Power Supply

###### Power Supply Voltage:

4.5 - 24 Vdc

###### Power Supply Current:

50 mA maximum

##### Outputs

###### Output Voltage:

Essentially square wave fanout to 10 TTL inputs

###### TTL Compatible: (See Figure 1)

50% ±15% duty cycle

Logic 0: +.6 Vdc maximum

Logic 1: +4 to +4.6 Vdc @ 5mA

###### Supply Tracking: (See Figure 2)

50% ±15% duty cycle

Logic 0: +.6 Vdc maximum

Logic 1: 
$$V_O = \frac{V_S \times R_L}{R_L + 2.2k}$$

###### Output Impedance:

2.2K Ohms ±5%

###### Output Current:

20 mA sink maximum

###### Output Current - Short Circuit:

5 mA maximum with 10V power supply

###### Reverse Battery Voltage:

-30 Vdc

##### Mechanical

###### Target Frequency:

0 to 15 kHz

###### Target Air Gap:

.005 to .020 with a 24 diametral pitch gear

.005 to .030 with a 20 diametral pitch gear

.005 to .050 with a 12 diametral pitch gear

.005 to .075 with an 8 diametral pitch gear

##### Environmental

###### Operating Temperature:

-40°C to +125°C

###### Thermal Shock:

100 cycles air to air (-40° to +130°C)

1 min. ramp time with 30 min. soak

###### Salt Spray:

Per MIL-STD-202, method 201, test cond. B, 5% NaCl for 48 hrs. No visible corrosion.

###### Humidity:

92% RH@ 40°C for 90 hrs.

No visible corrosion.

###### Dielectric Strength:

Per MIL-STD-202, method 301, 1000 Vrms (60Hz) for 5 sec. leads to case. 1.0 mA max. leakage.

###### Insulation Resistance:

Per MIL-STD-202, method 302, 500 Vdc for 30 sec. leads to case. 100 mega-ohm min.

###### Vibration:

Per MIL-STD-202, resonant frequency search, sine method 204, test cond. C&D (20g); random method 214a, test cond. A&B (7.56g) for 15 min.

###### Shock:

Per MIL-STD-202, method 213b (sawtooth), test cond. H&I (1 00g, 6 ms), 3 shocks, mutually perpendicular planes

##### Materials

###### Housing:

300 series stainless steel

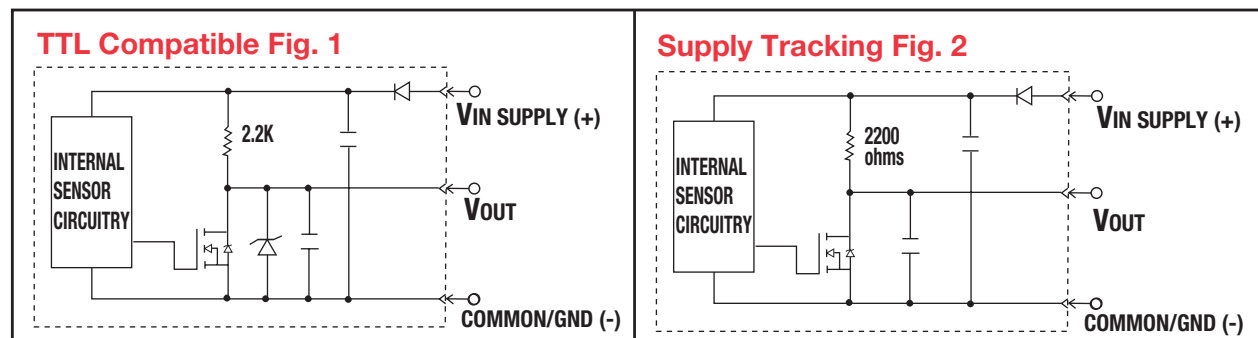
###### Leads:

AWG #24 Teflon, 200°C

###### Cable:

AWG #20 Irradiated cross-linked polyolefin, 125°C

Rotational alignment of sensing face is not required for optimum output signal.

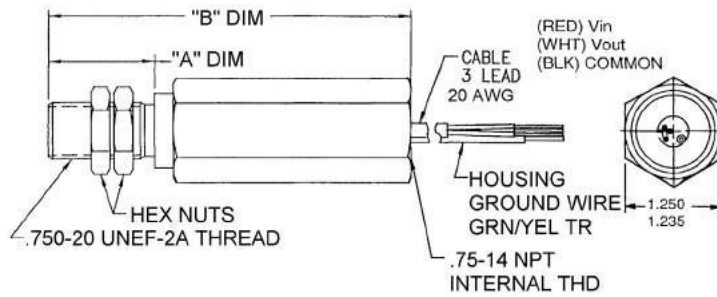


Note: Either output will work with any AI-Tek Tachometer.

# RH Series

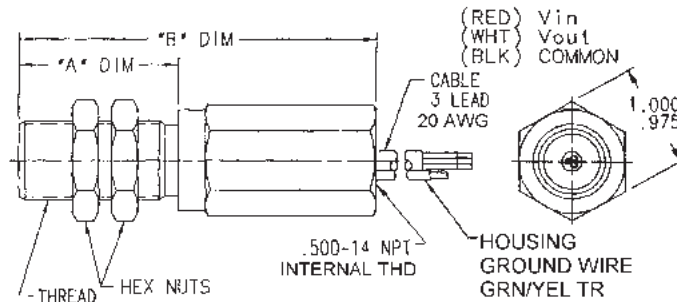
## Zero Velocity - Magnetic Hall Effect Sensors - 5/8 and 3/4 Threads

### UL/CSA Explosion Proof Sensors



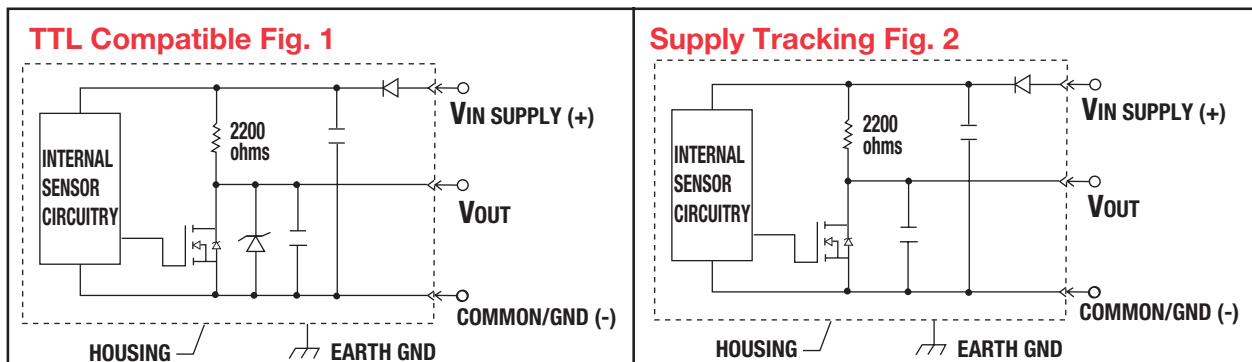
Part Num.	Thread	Thread Length	Overall Length	Cable Length	Output
RH1612-025	.750-20 UNEF-2A	1.375 (34.92)	4.750 (120.65)	10 ft. (3.0 m)	TTL Compatible

Rating: UL & CSA listed for hazardous locations. Class I, Div. 1, Groups A, B, C & D; Class II, Div., 1, Groups E, F & G. Temp Code T4A. Connect only to NEC Class 2 circuits.  
 Net Weight: 23 oz. max.



Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
RH1522-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking
RH1612-026	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.72.5)	10 ft (3.05m)	TTL Compatible
RH1622-026	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1612-027	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
RH1622-027	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking

Rating: UL & CSA listed for hazardous locations. Class I, Div. 1, Groups A, B, C & D; Class II, Div., 1, Groups E, F & G. Temp Code T4A. Connect only to NEC Class 2 circuits.  
 Net Weight: 9 oz. max.



Dimensions in inches and (mm).

# RH Series Zero Velocity - Magnetic Hall Effect Sensors - 3/8 Diameter

## Specifications

### Power Supply

#### Power Supply Voltage:

4.5 - 24 Vdc

#### Power Supply Current:

50 mA maximum

### Outputs

#### Output Voltage:

Essentially square wave fanout to 10 TTL inputs

#### Supply Tracking: (See Figure 1)

50% ±15 % duty cycle

Logic 0: +.6 Vdc maximum

Logic 1:  $V_O = \frac{V_S \times R_L}{R_L + 2.2k}$

#### Output Impedance:

2.2K Ohms ±5%

#### Output Current:

20 mA sink maximum

#### Output Current - Short Circuit:

5 mA maximum with 10V power supply

### Mechanical

#### Target Frequency:

0 to 15 kHz

#### Target Air Gap:

.005 to .015 with a 24 diametral pitch gear

.005 to .025 with a 20 diametral pitch gear

.005 to .050 with a 12 diametral pitch gear

.005 to .065 with an 8 diametral pitch gear

### Environmental

#### Operating Temperature:

-25°C to + 125°C (105°C Cable)

### Materials

#### Housing:

300 series stainless steel

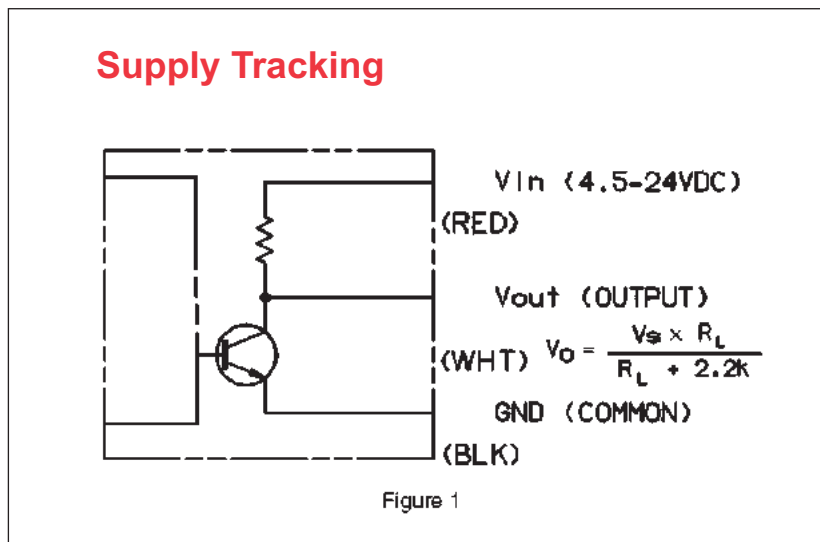
#### Leads:

AWG #24 Teflon, 200°C

#### Cable:

AWG #26 PVC, 105°C

Rotational alignment of sensing face is not required for optimum output signal



**Note:** Will work with any AI-Tek Tachometer.