

## 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

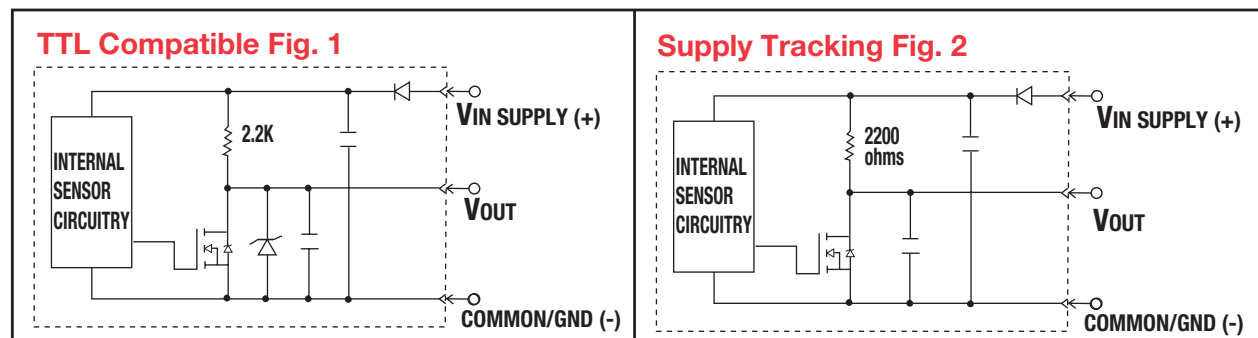
###### Leads:

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.

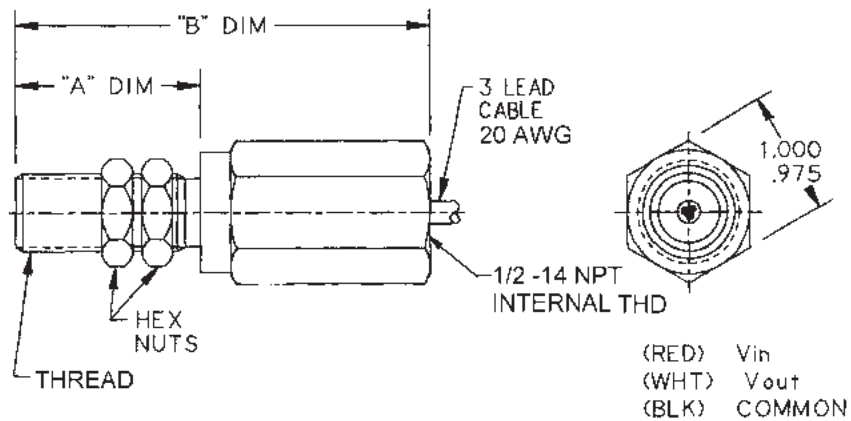


Note: Either output will work with any AI-Tek Tachometer.

## RH Series

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

#### Hex Body with Cable



Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
RH1522-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking
RH1612-013	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1622-013	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1612-014	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
RH1622-014	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking

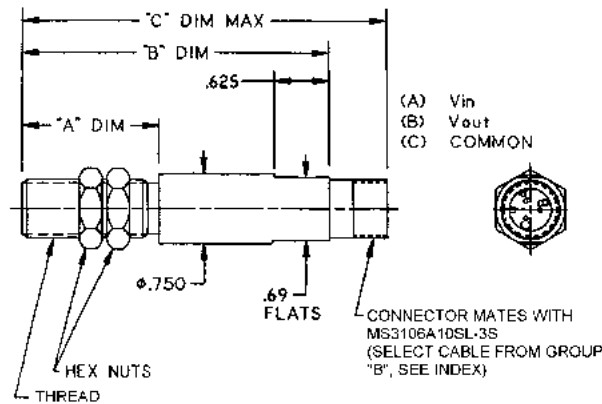
Net Weight: 9 oz. max.

**Dimensions in inches and (mm).**

## RH Series

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

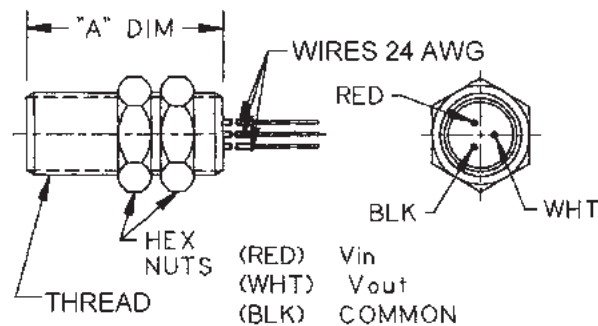
#### Round Body with Connector



Part Num.	Thread	"A" Dimension	"B" Dimension	"C" Dimension	Output
RH1512-005	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
RH1522-005	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
RH1512-006	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
RH1522-006	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
RH1512-007	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	TTL Compatible
RH1522-007	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (65.405)	Supply Tracking
RH1612-005	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
RH1622-005	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
RH1612-006	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
RH1622-006	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
RH1612-007	.750-20 UNEF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	TTL Compatible
RH1622-007	.750-20 UNEF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	Supply Tracking

Net Weight: 7 oz. max.

#### Fully Threaded with Leads



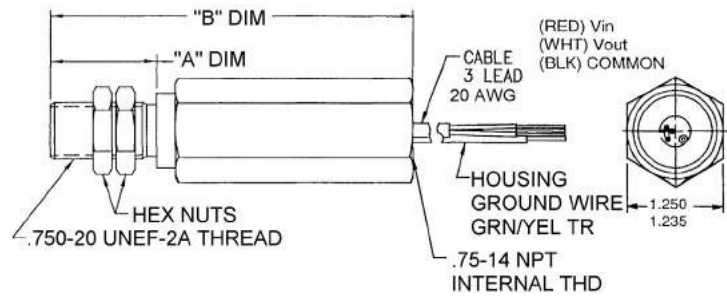
Part Num.	Thread	"A" Dimension	Lead Length	Output
RH1512-009	.625-18 UNF-2A	1.500 (38.100)	12(304)	TTL Compatible
RH1522-009	.625-18 UNF-2A	1.500 (38.100)	12(304)	Supply Tracking
RH1512-010	.625-18 UNF-2A	2.750 (69.850)	12(304)	TTL Compatible
RH1522-010	.625-18 UNF-2A	2.750 (69.850)	12(304)	Supply Tracking
RH1612-009	.750-20 UNEF-2A	1.500 (38.100)	12(304)	TTL Compatible
RH1622-009	.750-20 UNEF-2A	1.500 (38.100)	12(304)	Supply Tracking
RH1612-010	.750-20 UNEF-2A	2.750 (69.850)	12(304)	TTL Compatible
RH1622-010	.750-20 UNEF-2A	2,750 (69.850)	12(304)	Supply Tracking

Net Weight: 3 oz. max.

Dimensions in inches and (mm).

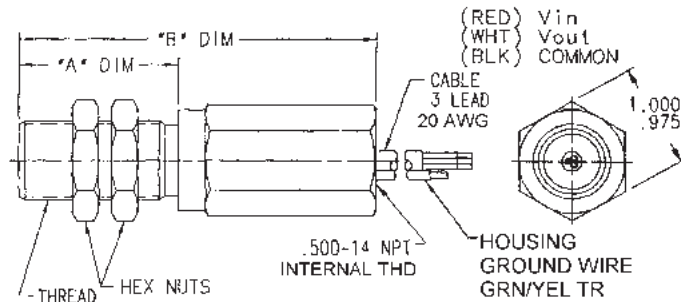
# RH Series Zero Velocity - Magnetic Hall Effect Sensors - 5/8 and 3/4 Threads

## UL/CSA Explosion Proof Sensors



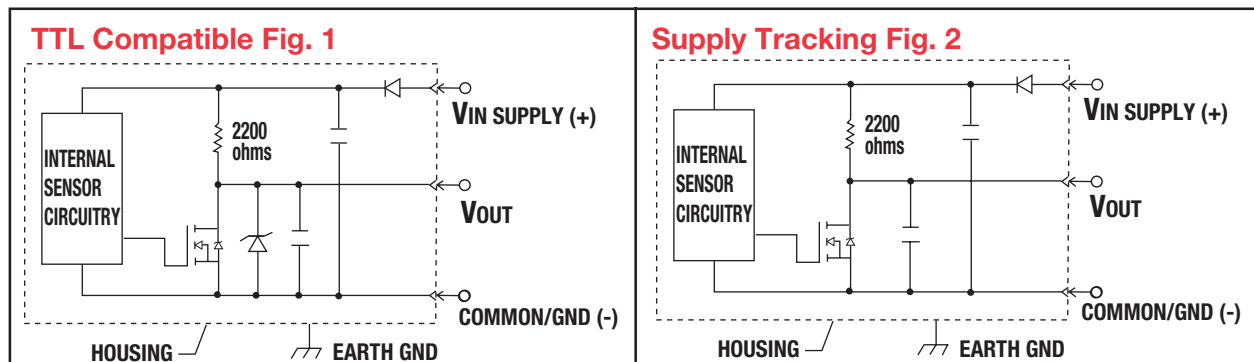
Part Num.	Thread	Thread Length	Overall Length	Cable Length	Output
RH1612-025	.750-20 UNEF-2A	1.375 (34.92)	4.750 (120.65)	10 ft. (3.0 m)	TTL Compatible

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

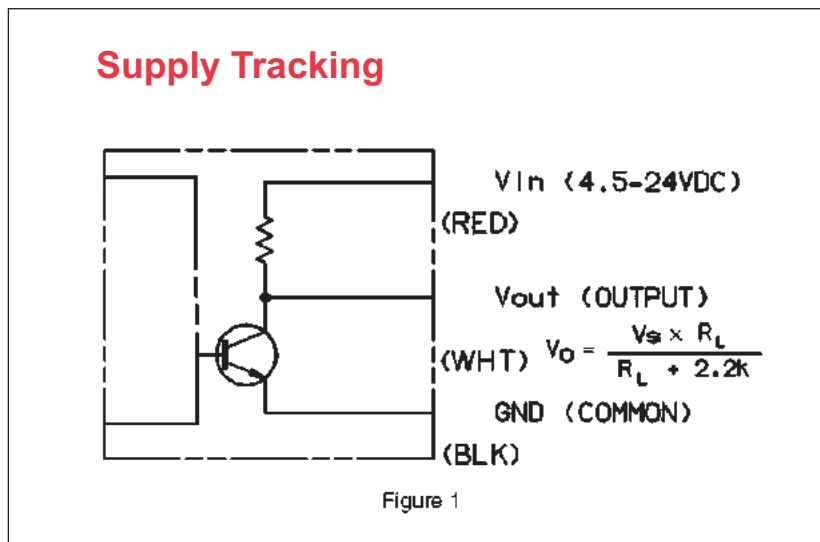
#### Leads:

AWG #24 Teflon, 200°C

#### Cable:

AWG #26 PVC, 105°C

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

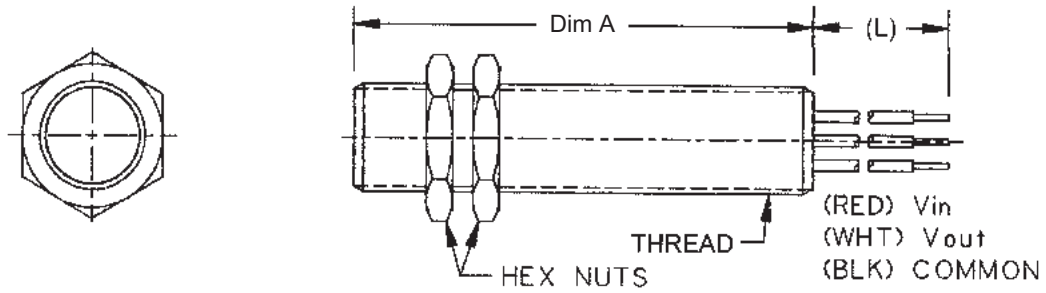


**Note:** Will work with any AI-Tek Tachometer.



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

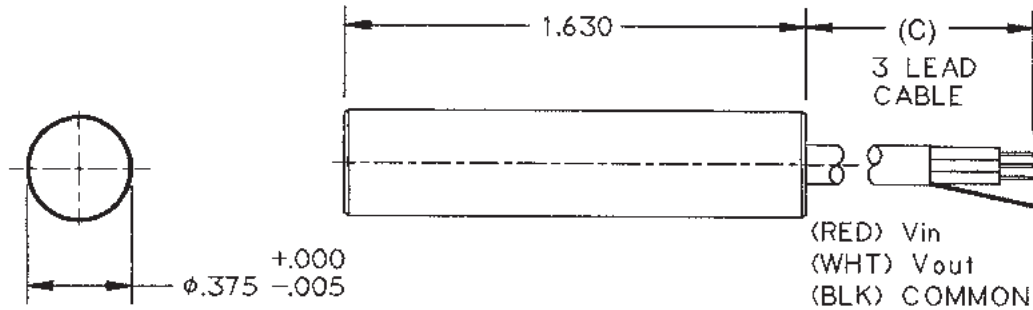
## Fully Threaded



Part Num.	Thread	Cable Length (C)	Lead Length (L)	Dimension A
RH1320-001	.375-32 UNEF-2A	—	12 (304)	1.630
RH1320-003	.375-32 UNEF-2A	10 ft. (3.05 m)	—	1.630
RH1320-009	.375-24 UNF-2A	—	12 (304)	1.630
RH1320-010	.375-24 UNF-2A	10 ft. (3.05 m)	—	1.630
RH1320-012	.375-24 UNF-2A	10 ft. (3.05 m)	—	3.000

New Weight: 0.7 oz. max.

## Round Body



Part Num.	Cable Length (C)	Lead Length (L)
RH1320-005	—	12 (304)
RH1320-006	10 ft. (3.05 m)	—

## DH SERIES

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

AI-Tek has taken its years of experience of designing and manufacturing Hall Effect sensors for harsh applications and has developed a line of durable products for industrial, rail, military and automotive use.

The new AI-TEK DH series sensors are differential based, zero-speed, precision, single channel, speed sensors. At power-up, they calibrate themselves to the unique magnetic signature of their installed application and continue to update the calibration as the sensor is running. This unique combination of differential sensing technology and calibration make these sensors highly tolerant of installation mis-alignment, target geometry and composition, target run-out, vibration and air gap changes.

In comparison, the RH series are single-element based, zero speed, single channel speed sensors and are an excellent choice for general purpose speed sensing. Unlike the DH series that requires rotational alignment at installation, the RH requires no alignment. Air gap adjustment is precise and easy and similar to a VR type sensor.

The new DH sensor can sense each change in target movement, regardless of speed, from 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:

- 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)
- Require special alignment
- Improved duty cycle
- Improved fine pitch performance
- Increased air gaps
- Special circuitry provides high level of EM1 hardness
- Select versions equipped with RTD temperature measurement output

Suitable for 32 diametral pitch or coarser gear (target), the standard catalog sensors are easily applied to your various sensing needs. If you have a unique, special requirement which cannot be met with any of the standard options, we will gladly review your specs and work with you on a special sensor design.

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

# DH 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% ±10% duty cycle

Logic 0: +.6 Vdc maximum

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

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

50% ±10% 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

**Defined Power on State - High**

**Single Tooth/Valley Compatible**

#### Mechanical

**Target Frequency:**

0 to 15 kHz

**Target Air Gap:**

.005 to .025 with a 32 diametral pitch gear

.005 to .055 with a 24 diametral pitch gear

.005 to .100 with a 20 diametral pitch gear

.005 to .120 with a 12 diametral pitch gear

.005 to .175 with an 8 diametral pitch gear

**Automatic Calibration:**

Power up +3 edges

Running Update

#### 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

**Connector:** MIL Style

Mates with MS3106A10SL-3S

**Leads:** (Available on special request)

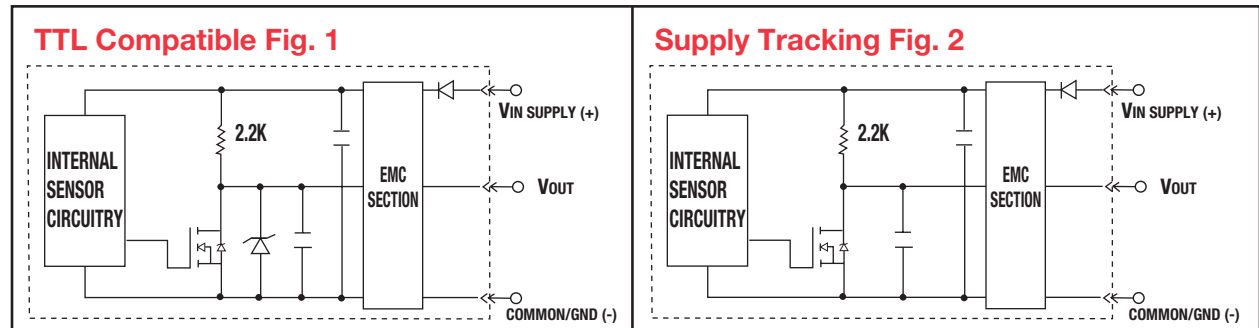
AWG #24 Teflon, 200°C

**Cable:**

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

**Alignment:**

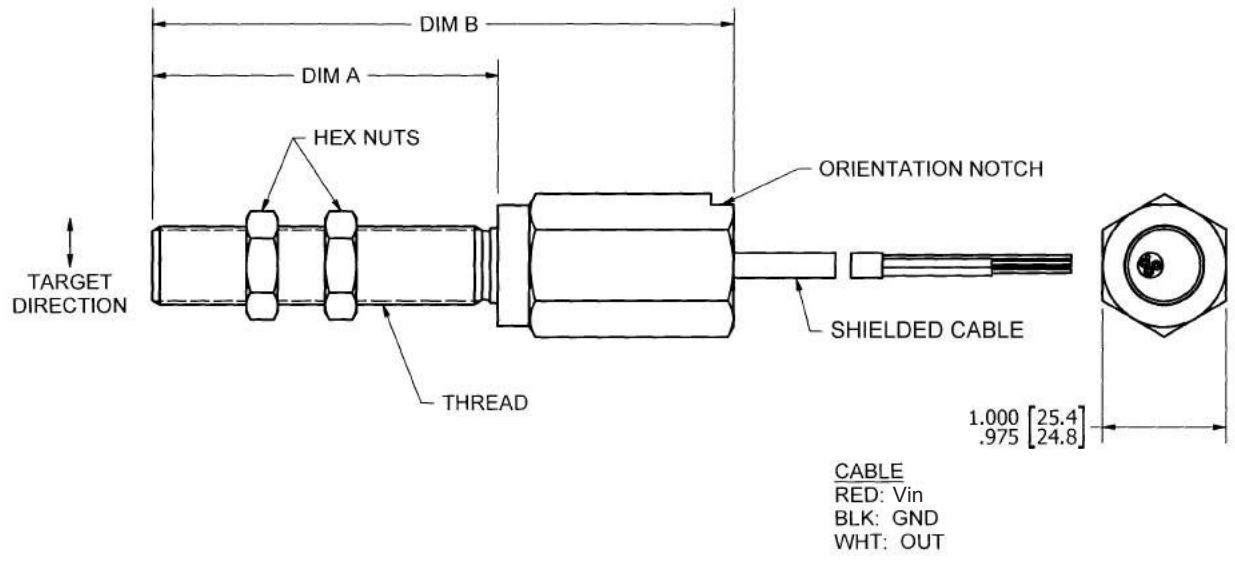
Rotational alignment of sensing face is required for optimum output signal. Align flats with direction of rotation.



# DH SERIES

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

### Hex Body with Cable



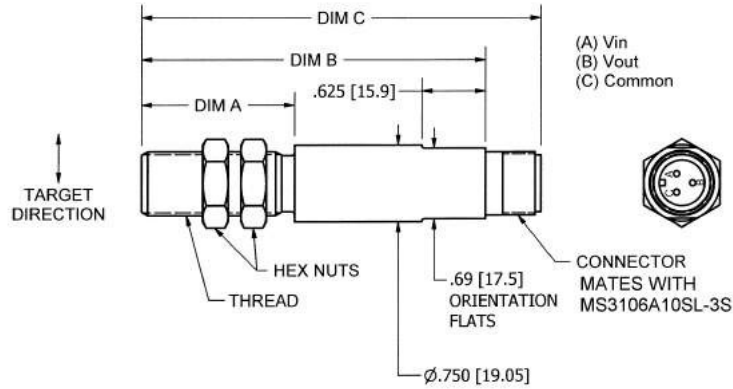
Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
DH1512-113	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
DH1522-113	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
DH1512-114	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
DH1522-114	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking

Net Weight: 9 oz. max.

**Dimensions in inches and (mm).**

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

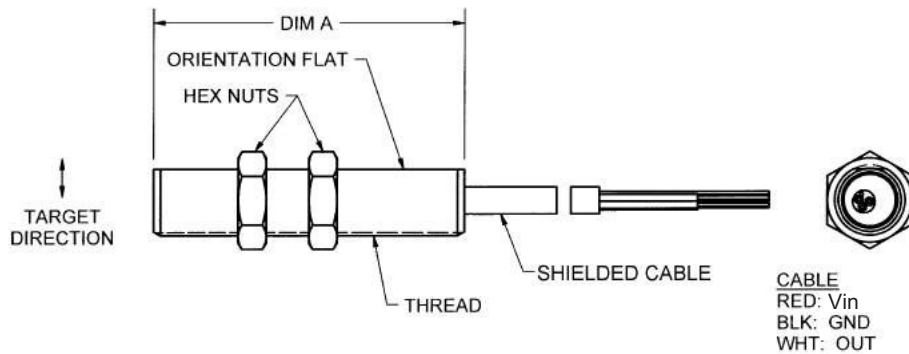
## Round Body with Connector



Part Num.	Thread	"A" Dimension	"B" Dimension	"C" Dimension	Output
DH1512-105	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
DH1522-105	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
DH1512-106	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
DH1522-106	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
DH1512-107	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	TTL Compatible
DH1522-107	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (65.405)	Supply Tracking
DH1612-105	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
DH1622-105	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
DH1612-106	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
DH1622-106	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking

Net Weight: 7 oz. max.

## Fully Threaded with Leads



Part Num.	Thread	"A" Dimension	Cable Length	Output
DH1512-109	.625-18 UNF-2A	1.500 (38.100)	10 ft (3.05m)	TTL Compatible
DH1522-109	.625-18 UNF-2A	1.500 (38.100)	10 ft (3.05m)	Supply Tracking
DH1512-110	.625-18 UNF-2A	2.750 (69.850)	10 ft (3.05m)	TTL Compatible
DH1522-110	.625-18 UNF-2A	2.750 (69.850)	10 ft (3.05m)	Supply Tracking

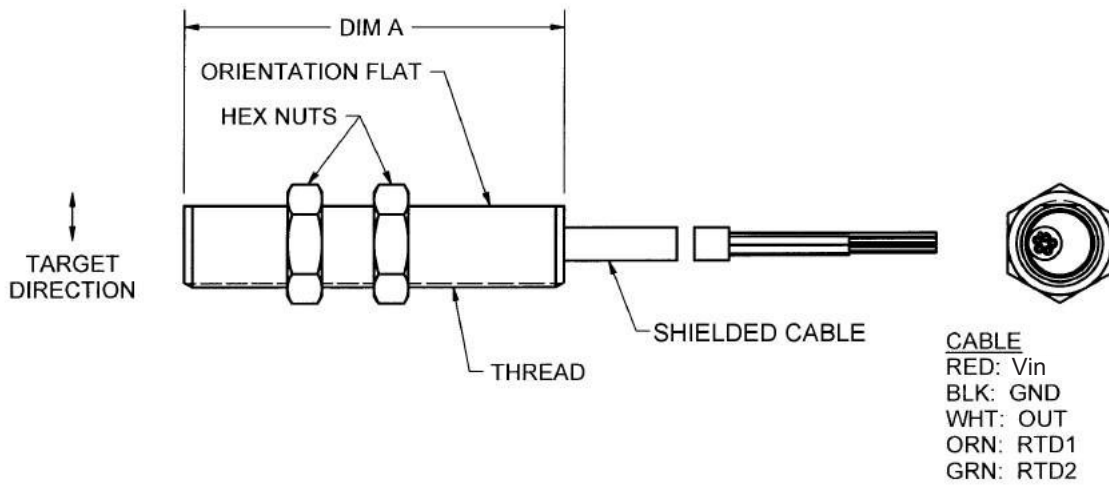
Net Weight: 3 oz. max.

**Dimensions in inches and (mm).**

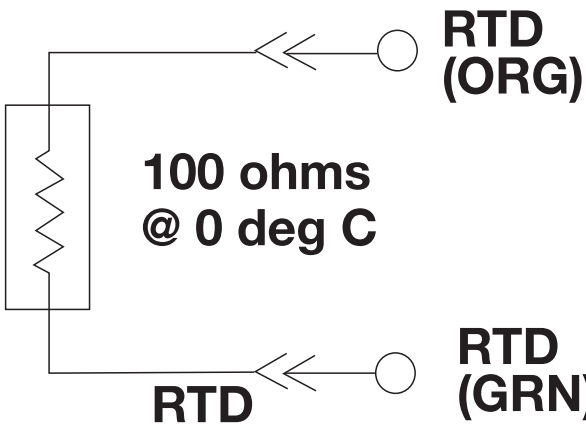
## DH SERIES

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

Fully Threaded with Cable and Temperature Output



Part Num.	Thread	"A" Dimension	Cable Length	Output
DH1512-210	.625-18 UNF-2A	2.750 (69.850)	10 ft (3.05m)	TTL Compatible
DH1522-210	.625-18 UNF-2A	2.750 (69.850)	10 ft (3.05m)	Supply Tracking



#### RTD

#### TEMPERATURE SENSOR:

Sensor Resistance: 0°C = 100 Ω in air

Temp coefficient (0°C - 100°C) = 0.00385 Ω/Ω/°C (AVE)

$T = [(R/100-1) \times 259.740^\circ\text{C} \pm 1.5^\circ\text{C}]$

$V_{\text{max}} = 1 \text{ vdc} / I_{\text{max}} = 1.0\text{mA}$

## **BH SERIES**

### **Bi-Directional, Dual Channel, Magnetic Hall Effect Speed Sensors - 5/8 and 3/4 Threads**

**AI-Tek** Bi-directional, zero velocity sensors are self-calibrating to the specific customer application and provide two independent frequency outputs and a direction signal output to indicate change in direction of the sensed, ferrous target.

The Bi-directional sensor can also be referred to as a dual channel sensor since it utilizes two Hall effect sensing elements, physically offset from each other. Each element generates a single channel of target information, identical in frequency and polarity, but offset in the time domain (phase shifted). Special circuits inside the sensor are designed to calibrate each channel to its application target, then analyze these two channels of information for a phase lead / lag condition. The direction output will then provide a logic 1 level for clockwise or a logic 0 for counterclockwise rotation, assuming proper sensor orientation.

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.*

## BH SERIES

### Active Sensor (Bi-Dir.) Selection Guide

Thread Size	Part Number	Supply Tracking or TTL	Termination	Thread Length (in)	Sensor Length (in)	Page
3/4-20	BH1612-001	TTL	Connector	1.5	3.375	40
3/4-20	BH1622-001	ST	Connector	1.5	3.375	40
3/4-20	BH1612-002	TTL	Connector	2.75	4.625	40
3/4-20	BH1622-002	ST	Connector	2.75	4.625	40
3/4-20	BH1612-013	TTL	Cable	1.5	3.375	40
3/4-20	BH1622-013	ST	Cable	1.5	3.375	40
3/4-20	BH1612-014	TTL	Cable	2.75	4.625	40
3/4-20	BH1622-014	ST	Cable	2.75	4.625	40
3/4-20	BH1612-005	TTL	Connector	1.5	3.375	41
3/4-20	BH1622-005	ST	Connector	1.5	3.375	41
3/4-20	BH1612-006	TTL	Connector	2.75	4.625	41
3/4-20	BH1622-006	ST	Connector	2.75	4.625	41
3/4-20	BH1612-009	TTL	Cable	4	4	41
3/4-20	BH1622-009	ST	Cable	4	4	41
3/4-20	BH1612-010	TTL	Cable	6	6	41
3/4-20	BH1622-010	ST	Cable	6	6	41
5/8-18	BH1512-001	TTL	Connector	1.5	3.375	40
5/8-18	BH1522-001	ST	Connector	1.5	3.375	40
5/8-18	BH1512-002	TTL	Connector	2.75	4.625	40
5/8-18	BH1522-002	ST	Connector	2.75	4.625	40
5/8-18	BH1512-013	TTL	Cable	1.5	3.375	40
5/8-18	BH1522-013	ST	Cable	1.5	3.375	40
5/8-18	BH1512-014	TTL	Cable	2.75	4.625	40
5/8-18	BH1522-014	ST	Cable	2.75	4.625	40
5/8-18	BH1512-005	TTL	Connector	1.5	3.375	41
5/8-18	BH1522-005	ST	Connector	1.5	3.375	41
5/8-18	BH1512-006	TTL	Connector	2.75	4.625	41
5/8-18	BH1522-006	ST	Connector	2.75	4.625	41
5/8-18	BH1512-009	TTL	Cable	4	4	41
5/8-18	BH1522-009	ST	Cable	4	4	41
5/8-18	BH1512-010	TTL	Cable	6	6	41
5/8-18	BH1522-010	ST	Cable	6	6	41



# BH SERIES

## Bi-Directional, Dual Channel, Magnetic Hall Effect Speed Sensors - 5/8 and 3/4 Threads

### Specifications

#### Power Supply

Power Supply Voltage: 10 - 28 Vdc

#### Power Supply Current:

100 mA maximum

#### Outputs

##### Output Voltage:

Essentially square wave fanout to 10 TTL inputs

TTL Compatible: (See Figure 1)

40% to 60% duty cycle

Logic 0: +.6 Vdc maximum

Logic 1: +4 to +5.0 Vdc @ 5mA

Supply Tracking: (See Figure 2)

40% to 60% duty cycle

Logic 0: +.6 Vdc maximum

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

##### Direction Logic:

Output high (Logic 1) with rotation toward notch

Output Impedance: 2.2K Ohms ±5%

##### Output Current:

20 mA sink max., 1.0 mA source max.

Reverse Battery Voltage: -30 Vdc

Rise/Fall Time: 5 μs / 3 μs typical

### Mechanical

Target Frequency: 0 to 15 kHz

#### Target Performance:

DIAMETRICAL PITCH	AIRGAP RANGE (Inches)
8	.051 - .160
10	.020 - .140
12	.010 - .120
20	.010 - .100
24	.005 - .050
32	.005 - .040

### 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 (100g, 6 ms), 3 shocks, mutually perpendicular planes

#### EMC:

Design principles consistent with BS/EN and MIL-STD's for EMC hardness

### Materials

#### Housing:

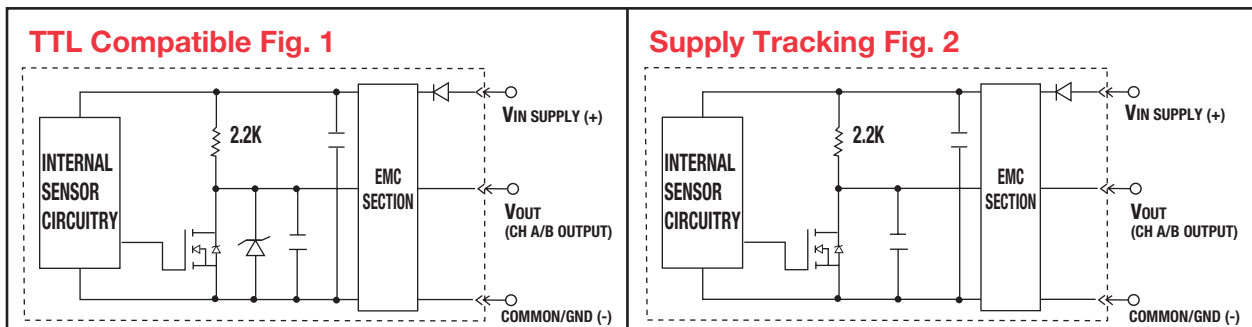
300 series stainless steel

#### Cable:

AWG #22 Irradiated cross-linked polyolefin, 125°C, 5 lead wires

#### Channel phasing: 45° to 135°

Sensor must be aligned. Target rotation toward notch/flat results in Logic 1 direction output.

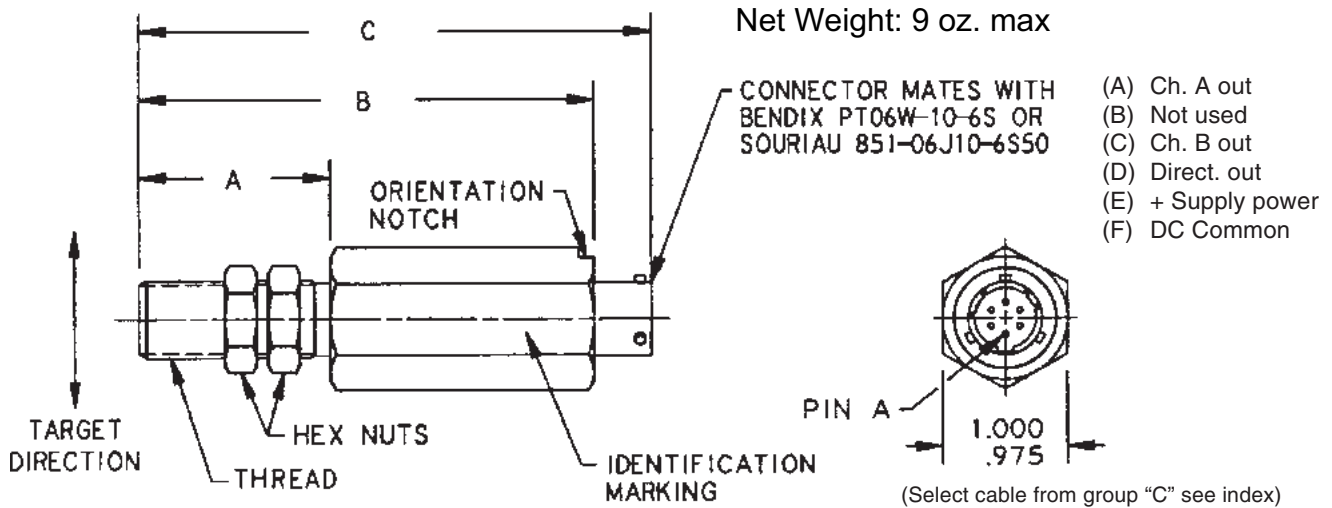


Note: Either output will work with any AI-Tek Tachometer.

## BH SERIES

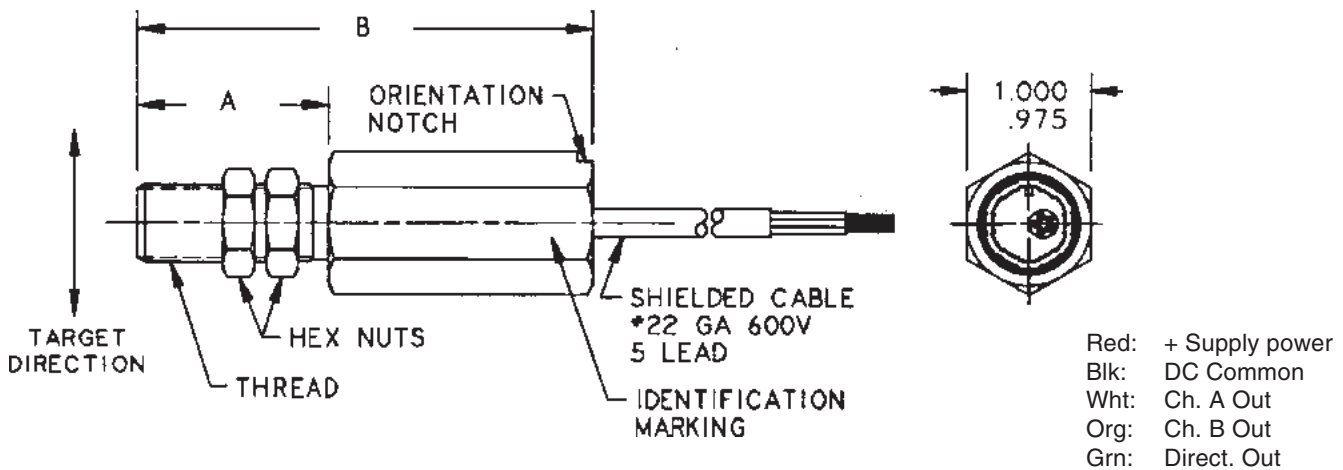
### Bi-Directional, Dual Channel, Magnetic Hall Effect Speed Sensors - 5/8 and 3/4 Threads

#### Bi-Directional, Hex Body with 6 Pin Connector



Part Num.	Thread	"A" Dim.	"B" Dim.	"C" Dim. (max.)	Output
BH1512-001	.625-18UNF-2A	1.500 (38.1)	3.375 (85.7)	3.875 (98.4)	TTL Compatible
BH1522-001					Supply Tracking
BH1512-002		2.750 (69.9)	4.625 (117.5)	5.125 (130.2)	TTL Compatible
BH1522-002					Supply Tracking
BH1612-001	.750-20UNEF-2A	1.500 (38.1)	3.375 (85.7)	3.875 (98.4)	TTL Compatible
BH1622-001					Supply Tracking
BH1612-002		2.750 (69.9)	4.625 (117.5)	5.125 (130.2)	TTL Compatible
BH1622-002					Supply Tracking

#### Bi-Directional, Hex Body with Cable

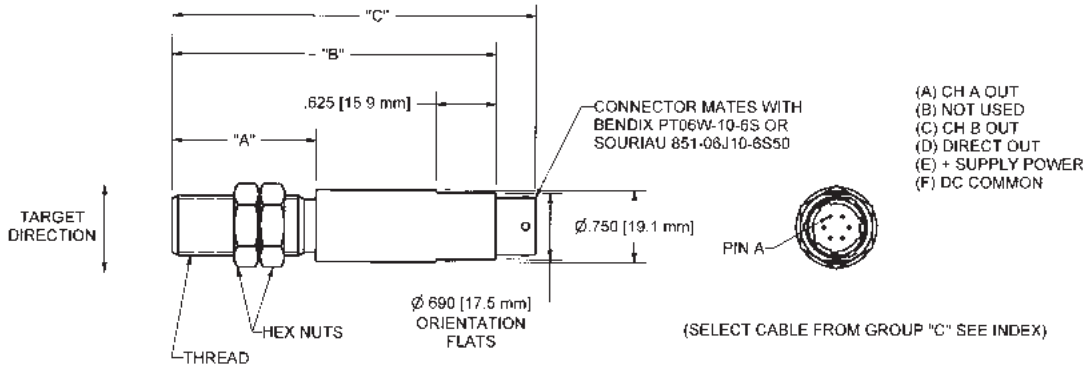


Part Num.	Thread	"A" Dim.	"B" Dim.	Cable Length	Output
BH1512-013	.625-18UNF-2A	1.500 (38.1)	3.375 (85.7)	10 ft. (3.05m)	TTL Compatible
BH1522-013					Supply Tracking
BH1512-014		2.750 (69.9)	4.625 (117.5)		TTL Compatible
BH1522-014					Supply Tracking
BH1612-013	.750-20UNEF-2A	1.500 (38.1)	3.375 (85.7)	10 ft. (3.05m)	TTL Compatible
BH1622-013					Supply Tracking
BH1612-014		2.750 (69.9)	4.625 (117.5)		TTL Compatible
BH1622-014					Supply Tracking

# BH SERIES

## Bi-Directional, Dual Channel, Magnetic Hall Effect Speed Sensors - 5/8 and 3/4 Threads

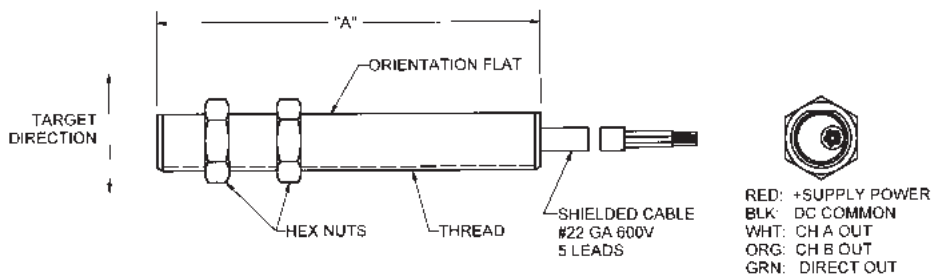
### Bi-Directional, Round Body with Connector



Part Num.	Thread	"A" Dim.	"B" Dim.	"C" Dim. (max.)	Output
BH1512-005	.625-18 UNF-2A	1.500 (38.1)	3.375 (85.7)	3.875 (98.4)	TTL Compatible
BH1522-005					Supply Tracking
BH1512-006		2.750 (69.9)	4.625 (117.5)	5.125 (130.2)	TTL Compatible
BH1522-006					Supply Tracking
BH1612-005	.750-20 UNEF-2A	1.500 (38.1)	3.375 (85.7)	3.875 (98.4)	TTL Compatible
BH1622-005					Supply Tracking
BH1612-006		2.750 (69.9)	4.625 (117.5)	5.125 (130.2)	TTL Compatible
BH1622-006					Supply Tracking

Net Weight: 6 oz. max

### Bi-Directional, Fully Threaded with Cable



Part Num.	Thread	"A" Dim.	Cable Length	Output
BH1512-009	.625-18 UNF-2A	4.000 (101.6)	10 ft. (3.05m)	TTL Compatible
BH1522-009				Supply Tracking
BH1512-010		6.000 (152.4)		TTL Compatible
BH1522-010				Supply Tracking
BH1612-009	.750-20 UNEF-2A	4.000 (101.6)		TTL Compatible
BH1622-009				Supply Tracking
BH1612-010		6.000 (152.4)		TTL Compatible
BH1622-010				Supply Tracking

Net Weight: 11 oz. max

Dimensions in inches and (mm).