

## **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.*

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### 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  $\pm$ 5%

##### Output Current:

20 mA sink max., 1.0 mA source max.

**Reverse Battery Voltage:** -30 Vdc

**Rise/Fall Time:** 5  $\mu$ s / 3  $\mu$ s 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

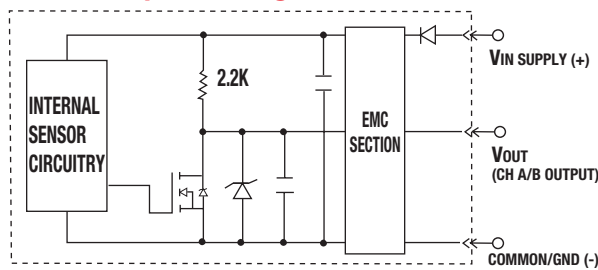
#### Cable:

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

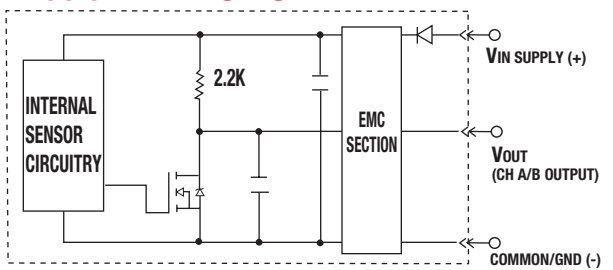
#### Channel phasing: 45° to 135°

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

**TTL Compatible Fig. 1**



**Supply Tracking Fig. 2**

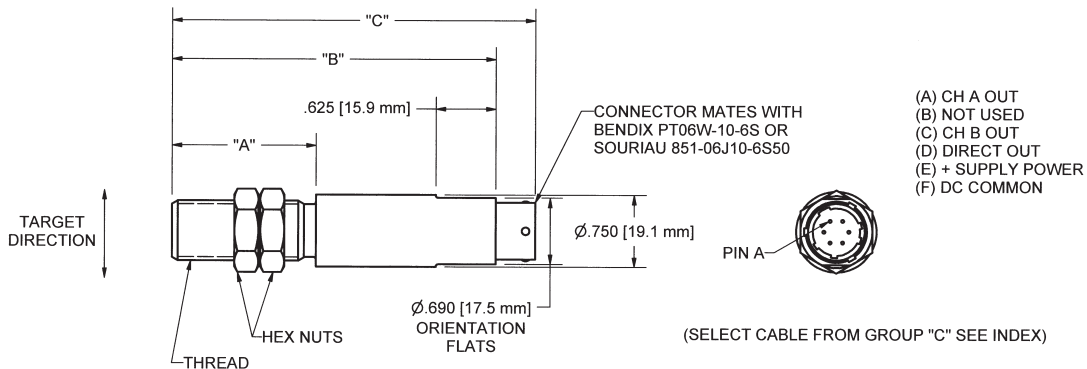


Note: Either output will work with any AI-Tek Tachometer.

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

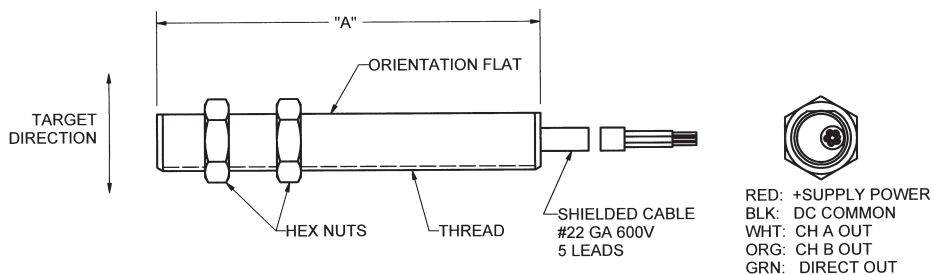
### Bi-Directional, Round Body with Connector



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)	10 ft. (3.05m)	TTL Compatible
BH1622-009				Supply Tracking
BH1612-010		6.000 (152.4)		TTL Compatible
BH1622-010				Supply Tracking

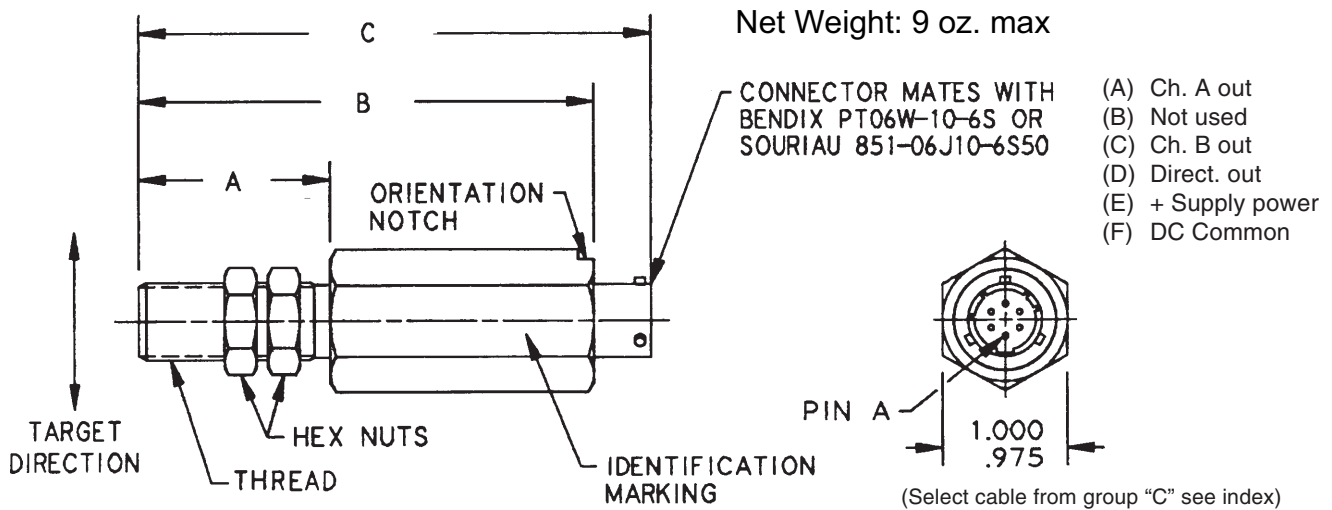
Net Weight: 11 oz. max

Dimensions in inches and (mm).

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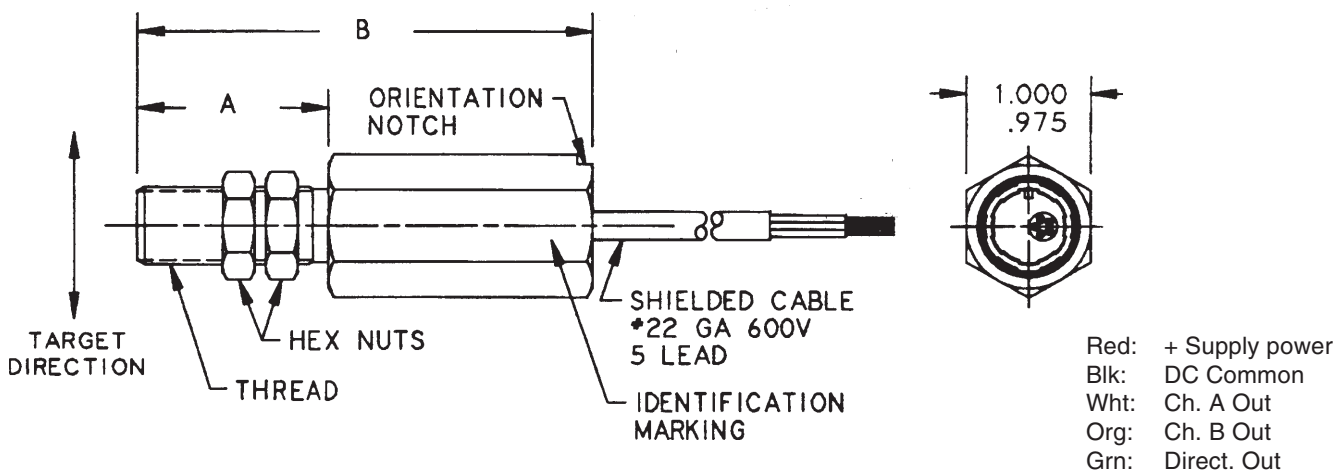
### Bi-Directional, Dual Channel, Magnetic Hall Effect Speed Sensors - 5/8 and 3/4 Threads

#### 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