

## 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, up to -30 Vdc, to prevent damage if miswired
- Higher temperature range of -40°C to +125°C
- Wide range of supply voltage in single design of 4.5 – 24 Vdc
- Two output options of Supply Tracking or TTL Compatible
- Rugged design meeting IEC 77 Standards (European Railroad Applications)

Suitable for 20 diametral pitch or coarser gear (target), the standard catalog sensors are easily applied to your varied 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.*

# 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% ±30% duty cycle

Logic 0: +.6 Vdc maximum

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

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

50% ±30% 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 20 diametral pitch gear

.005 to .045 with a 12 diametral pitch gear

.005 to .060 with a 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 (100g, 6 ms), 3 shocks, mutually perpendicular planes.

## Materials

**Housing:**

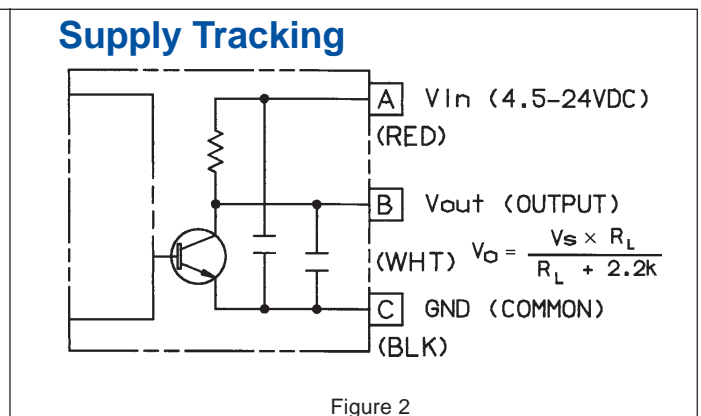
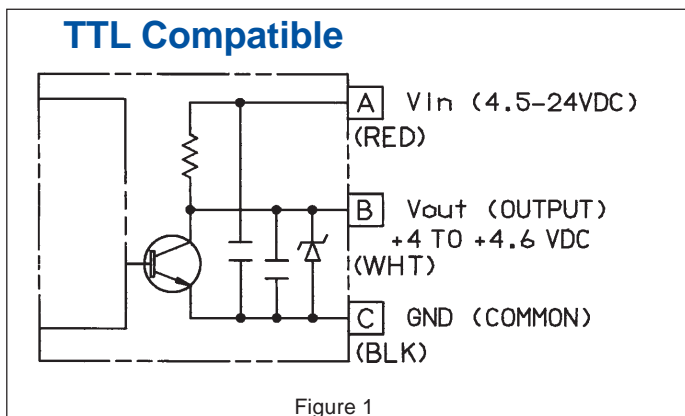
300 series stainless steel

**Leads:**

AWG #24 Teflon, 200°C

**Cable:**

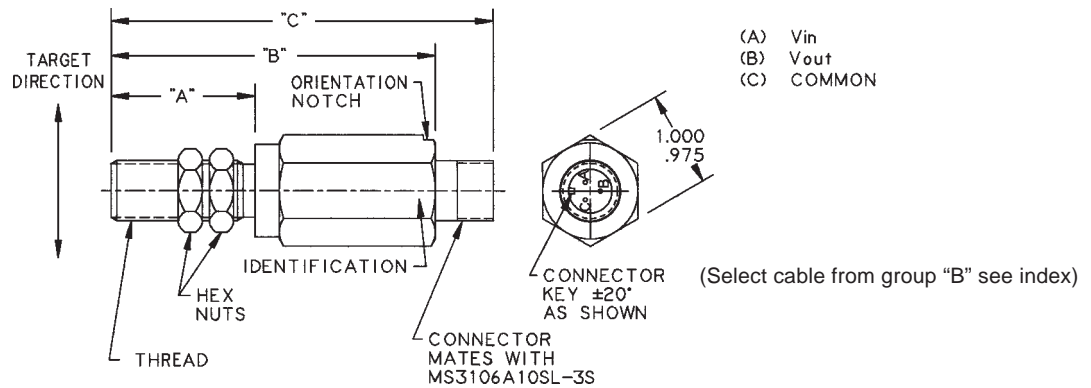
AWG #20 Irradiated cross-linked polyolefin, 125°C



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

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

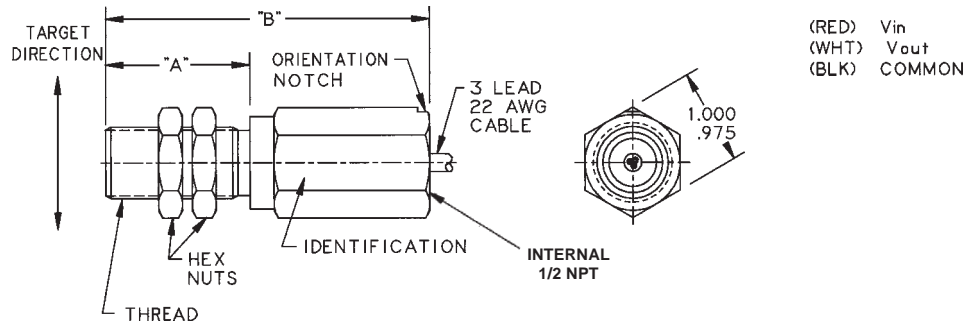
## Hex Body with Connector



Part Num.	Thread	"A" Dimension	"B" Dimension	"C" Dimension	Output
H1512-001	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
H1522-001	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
H1512-002	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
H1522-002	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
H1612-001	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
H1622-001	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
H1612-002	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
H1622-002	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking

Net Weight: 9 oz. max.

## Hex Body with Cable



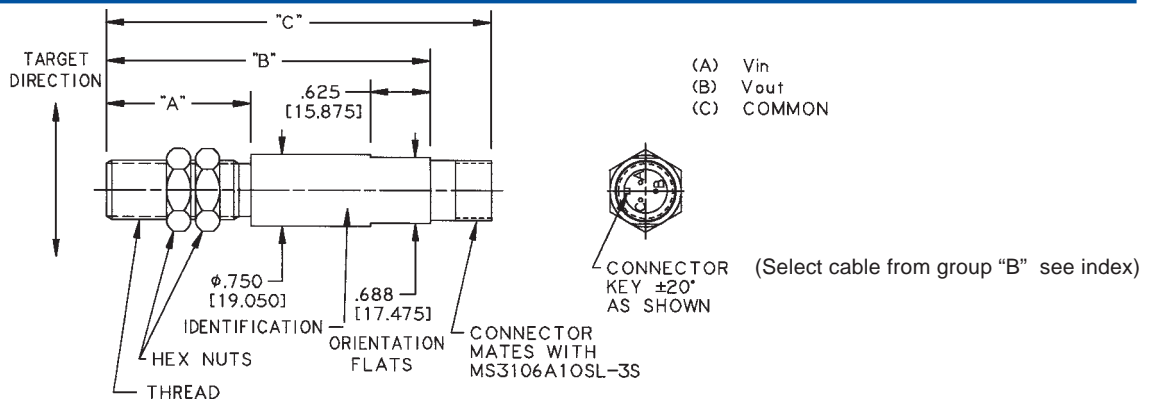
Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
H1512-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
H1522-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
H1512-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
H1522-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking
H1612-013	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
H1622-013	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
H1612-014	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
H1622-014	.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).**

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

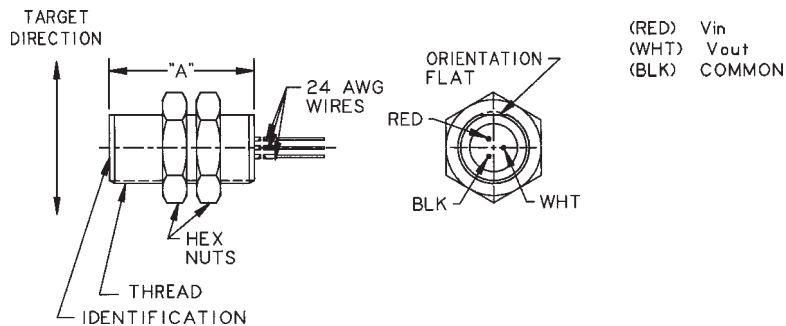
## Round Body with Connector



Part Num.	Thread	"A" Dimension	"B" Dimension	"C" Dimension	Output
H1512-005	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
H1522-005	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
H1512-006	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
H1522-006	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
H1512-007	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	TTL Compatible
H1522-007	.625-18 UNF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	Supply Tracking
H1612-005	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	TTL Compatible
H1622-005	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	4.012 (101.905)	Supply Tracking
H1612-006	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	TTL Compatible
H1622-006	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	5.262 (133.655)	Supply Tracking
H1612-007	.750-20 UNEF-2A	4.000 (101.600)	5.875 (149.225)	6.512 (165.405)	TTL Compatible
H1622-007	.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



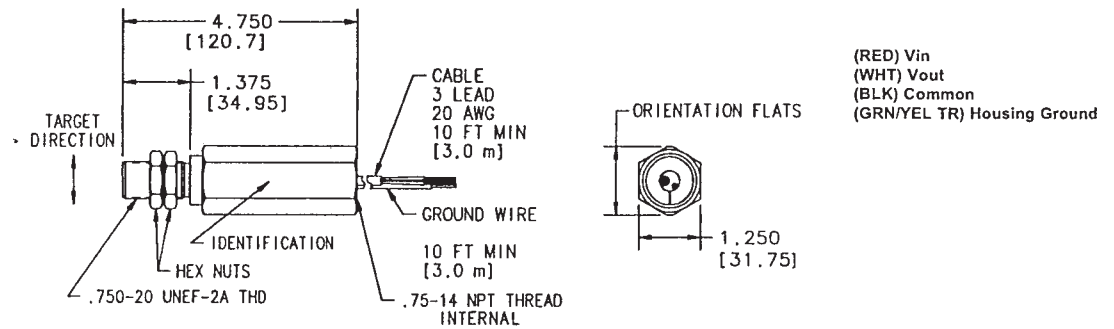
Part Num.	Thread	"A" Dimension	Lead Length	Output
H1512-009	.625-18 UNF-2A	1.500 (38.100)	12 (304)	TTL Compatible
H1522-009	.625-18 UNF-2A	1.500 (38.100)	12 (304)	Supply Tracking
H1512-010	.625-18 UNF-2A	2.750 (69.850)	12 (304)	TTL Compatible
H1522-010	.625-18 UNF-2A	2.750 (69.850)	12 (304)	Supply Tracking
H1612-009	.750-20 UNEF-2A	1.500 (38.100)	12 (304)	TTL Compatible
H1622-009	.750-20 UNEF-2A	1.500 (38.100)	12 (304)	Supply Tracking
H1612-010	.750-20 UNEF-2A	2.750 (69.850)	12 (304)	TTL Compatible
H1622-010	.750-20 UNEF-2A	2.750 (69.850)	12 (304)	Supply Tracking

Net Weight: 3 oz. max.

*Dimensions in inches and (mm).*

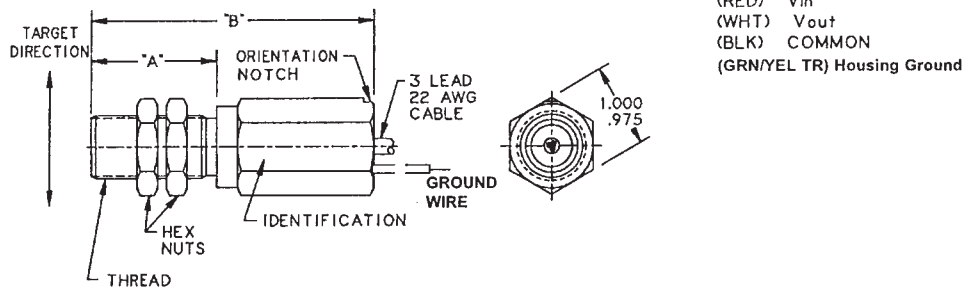
# Zero Velocity – Magnetic Hall Effect Sensors – 5/8 and 3/4 Threads

## UL/CSA Explosion Proof Sensors



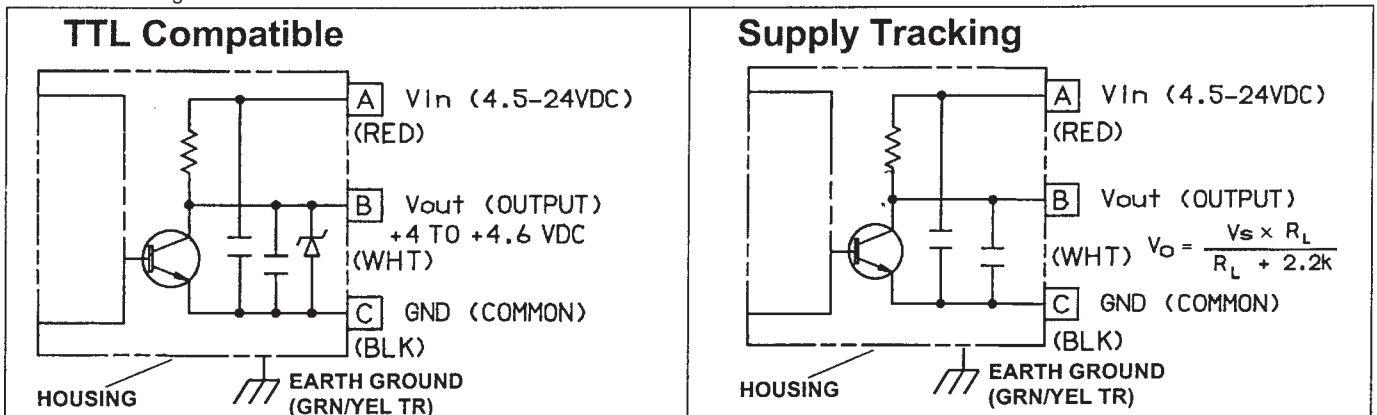
Part Num.	Thread	Thread Length	Overall Length	Cable Length	Output
H1612-025	.750-20 UNEF-2A	1.375 (34.92)	4.750 (120.65)	10 ft. (3.0 m)	TTL Compatible

**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
H1512-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
H1522-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
H1512-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
H1522-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	Supply Tracking
H1612-026	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
H1622-026	.750-20 UNEF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
H1612-027	.750-20 UNEF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)	TTL Compatible
H1622-027	.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).

# 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% ±30% 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:

.000 to .015 with a 20 diametral pitch gear

.000 to .040 with a 12 diametral pitch gear

.000 to .055 with a 8 diametral pitch gear

## Environmental

### Operating Temperature:

-25°C to +125°C (105°C Cable)

## Materials

### Housing:

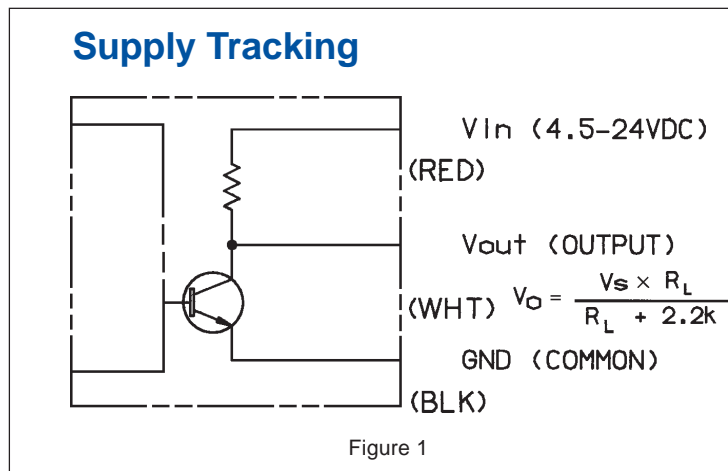
300 series stainless steel

### Leads:

AWG #24 Teflon, 200°C

### Cable:

AWG #26 PVC, 105°C

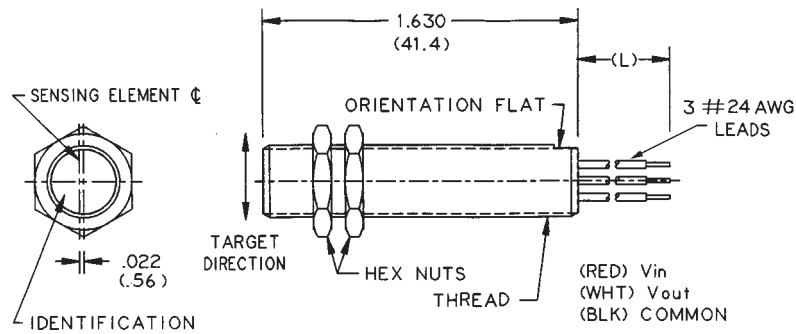


**Note:** Will work with any AI-Tek Tachometer.

*Dimensions in inches and (mm).*

# Zero Velocity – Magnetic Hall Effect Sensors – 3/8 Diameter

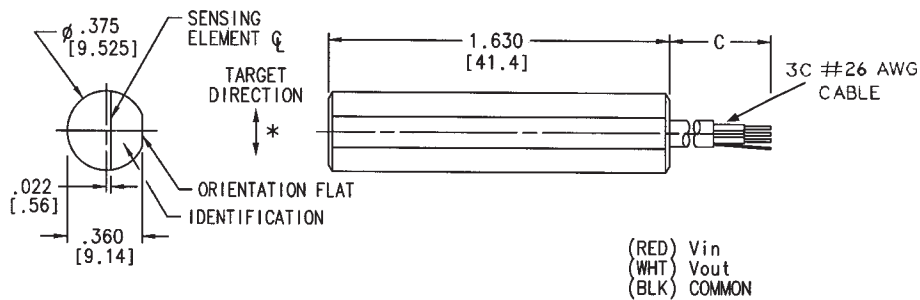
## Fully Threaded



Part Num.	Thread	Cable Length (C)	Lead Length (L)
H1320-001	.375-32 UNEF-2A	—	12 (304)
H1320-003	.375-32 UNEF-2A	10 ft. (3.05 m)	—
H1320-009	.375-24 UNF-2A	—	12 (304)
H1320-010	.375-24 UNF-2A	10 ft. (3.05 m)	—

Net Weight: 0.7 oz. max.

## Round Body



Part Number	Cable Length (C)	Lead Length (L)
H1320-005	—	12 (304)
H1320-006	10 ft (3.05 m)	—

Net Weight: 0.5 oz. max.

\* Note difference in target direction with regard to flat (vs. threaded sensor).

*Dimensions in inches and (mm).*