Table of Contents

SENSORS

Introduction 3

Principles of Operation 4

Magnetic Sensor Selection 5

Calculation of Output Voltage 6

Passive Speed Sensors 7

Side Look Sensor 19

Hall Effect Sensors 21

Zero Velocity/Magnetic 22

Bi-Directional, Dual Channel 28

Connectors and Cable Assemblies 32

Split Gears/Solid Gears 34

Tachometer Transducers 36

Sensor Mounting Brackets 38

Index 39

AI-TEK INSTRUMENTS IS AN ISO 9001 COMPANY

AI-Tek Instruments, Cheshire, CT USA

Speed Sensors

AI-Tek Instruments manufactures hundreds of different designs of speed sensors. This catalog lists the standard units we developed, based on years of design experience and knowledge, to provide you readily available products to solve your sensor solution to your speed control or indication needs. Many of the hundreds of **AI-Tek** speed sensors we produce are designed for special applications which allows us to offer a highly versatile and flexible product line.

Designed to meet severe industrial, automotive and aerospace environments, **AI-Tek** speed sensors, will provide reliable, around-the-clock operation for many years under adverse conditions. Our design engineers have paid particular attention to trouble areas such as vibration, shock, extreme temperatures, wet, oily and corrosive atmospheres. Many of our speed sensors are specifically designed for high temperature, high or low speeds, various targets or for precise accuracy and timing applications. **AI-Tek** uses primarily the two technologies of variable reluctance, and Hall effect to convert motion into an electronic signal. By selecting the best technology for a specific application we can assure years of reliable performance.

This catalog offers a variety of options readily available through our distributors. If you cannot find a catalog item to meet your specific requirements, please contact your area distributor with your specifics; there is probably an existing design which comes close to your requirements. As a world leader in producing quality speed sensors, **AI-Tek Instruments** will provide a superb price/performance ratio.

Passive Magnetic Sensors

Control and protection circuits have relied on variable reluctance technology for years. With few components and no moving parts, the passive magnetic speed sensors can provide a signal from the inside of an aircraft engine at temperatures approaching 425°C or from the hub of an automobile wheel at high shock and vibration. The advantages of these sensors are:

- High reliability
- Simple installation
- Long life due to no moving parts or contacts
- Self powered operation
- Wide variety of shapes and sizes
- Easy alignment
- Can be designed for almost any environment

Due to their flexibility, you will find **AI-Tek** variable reluctance sensors in everything from low-cost consumer products to highly-accurate automotive engine ignition systems to flight-worthy aircraft engine controls.

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

The information contained herein is subject to change without notice. Refer to the factory for verification of any details.

Principles of Operation

The internal construction of the typical **Al-Tek** variable reluctance sensor is a magnet, pole piece and coil (See figure 1). A magnetic field (lines of flux) extends from the magnet, through the pole piece and coil out into the air space at the end of the sensor. The return path of the magnetic field is from the air space to the other end of the magnet. As a ferrous object approaches the tip of the pole piece, the magnetic field increases and then decreases as the object moves away from the pole piece. The snap or the rapid change in the magnetic field induces an AC voltage signal in the coil. With an ideal target and matching sensor, the induced voltage is in the shape of a sine wave.

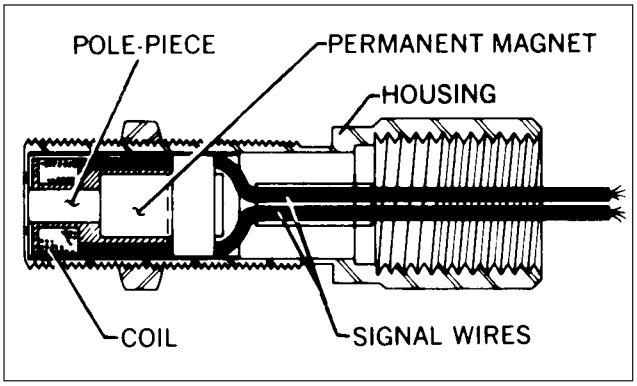


Figure 1 - Internal configuration of typical sensors.

As can be seen, the generated frequency signal is directly proportional to the number of ferrous objects passing the pole piece per unit time. The amplitude of the voltage output is proportional to the speed of the ferrous objects passing the pole piece.

Many applications of **Al-Tek** magnetic sensors use gears as targets. Typical sensor output wave forms with various targets are illustrated in Figure 3. Testing sensors with gears rather than other ferrous discontinuities such as sprockets, keyways, boltheads, etc. is because the output is predictable and repeatable. See Figure 2 for commonly used gear terminology.

$$\text{Diametral Pitch} = \frac{\text{No. of Teeth} + 2}{\text{Outside Dia. of Gear (in.)}}$$

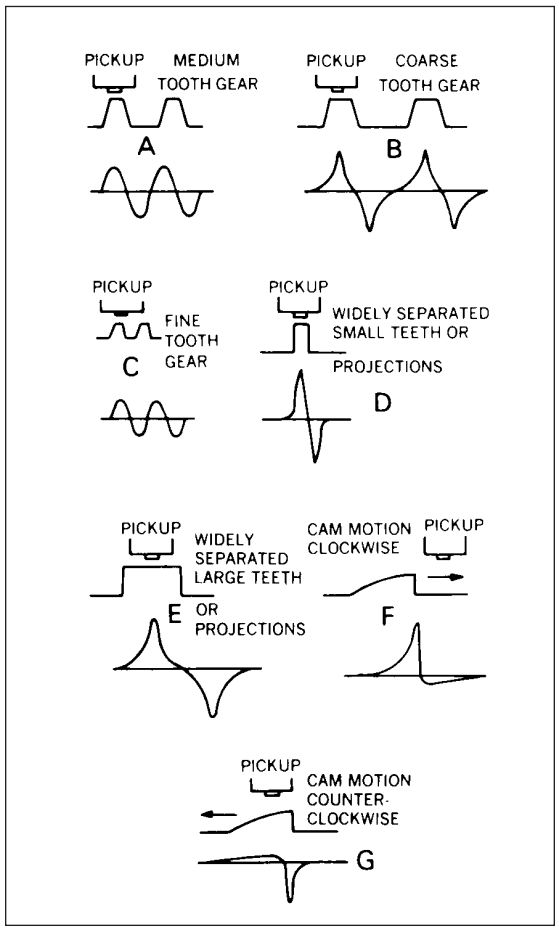


Figure 3 - Generated voltage waveforms.

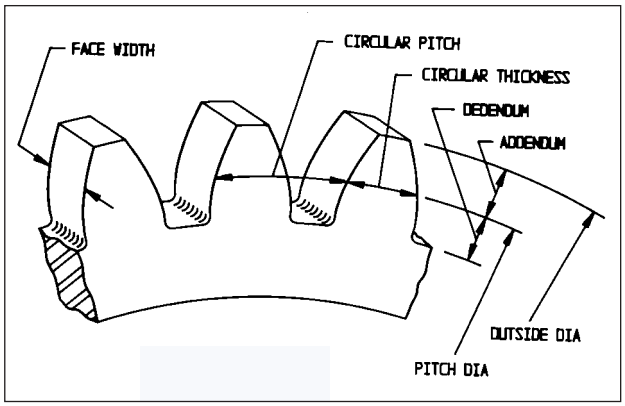


Figure 2 - Common terms used in defining gears.

The performance of a sensor can be easily defined when using a gear for a target; it also allows for estimated performance with alternate targets. **Al-Tek** sensors are tested with AGMA standard gears; the performance curves are included in this catalog.

Al-Tek Instruments differs from most sensor manufacturers in the presentation of performance curves and test parameters. Most existing data is specified at a surface speed of 1000 in/sec and 0.005 in. air gap; we feel that a 0.030 in. air gap and 500 in sec. surface speed (1800 RPM motor with 5 to 6 in. dia. gear) are more realistic parameters to specify performance.

Al-Tek Instruments, Cheshire, CT USA

Magnetic Sensor Selection

The following information is supplied for assistance in selecting the proper sensors for your particular applications. One of the fundamental questions to be answered is, “Will there be enough sensor output voltage at the lowest operating speed?”

The sensor output voltage depends on:

- Surface Speed - speed target passes pole piece
- Gap - distance between target and pole piece
- Target Size - geometric relationship of pole piece and target
- Load Impedance - connected to sensor

The surface speed of a gear depends upon its diameter and RPM. Surface speed is expressed in terms of inches per second (IPS).

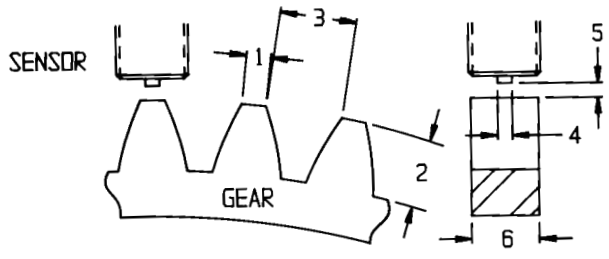
$$\text{Surface Speed (IPS)} = \frac{\text{RPM} \times \text{Outside Dia. (in.)} \times \pi}{60}$$

There is an optimum pitch (or tooth size) to obtain the highest possible output from a sensor, but this is seldom necessary. Figure 4 illustrates the relationship of tooth size and spacing for optimum magnetic sensor output. Using a fine tooth gear, relative to a large pole piece diameter sensor, results in a lower generated voltage because the flux also passes into adjacent teeth, resulting in a lower total flux variation.

The relationship between pole piece diameter and gear pitch and its effect on the output of a sensor is described in Table A.

Table A: Relative Output Vs. Gear Pitch

Pole Piece Dia. (in)	Gear Pitch						
	8	12	16	20	24	32	48
.187	1.00	0.83	0.33	0.16	—	—	—
.106	1.41	1.41	1.27	1.00	0.70	0.28	0.07
.093	1.25	1.25	1.25	1.00	0.75	0.37	0.12
.062	0.95	1.07	1.00	1.00	0.92	0.90	0.36
.040	1.00	1.00	1.00	1.00	1.00	0.90	0.60



1. Dimension of tooth top surface
2. Tooth height
3. Space between teeth
4 Pole piece diameter
5. Air gap
6. Gear face width

For maximum control and approximately sinusoidal waveform, the following conditions should be obtained:

(1) equal to or slightly less than (4)
(2) equal to or more than (3)
(3) approximately 1.5 to 3 times (4)
(5) as small as possible, .005” minimum
(6) equal to or more than (4)

Figure 4: Sensor output as a function of gear tooth size.

The load impedance, with relation to the internal impedance of the sensor, dictates the amount of sensor output voltage that will be seen by that load. Magnetic sensors are designed with the lowest practical impedance consistent with providing maximum output. The load impedance should be high in relation to the impedance of the sensor to minimize the voltage drop across the coil and to deliver the maximum output to the load.

Most of the output voltages listed in this catalog are based on a load impedance of 100k ohms. To use a generality, the load impedance should be 10 times that of the sensor.

In order to assist you in selecting your sensor, **Al-Tek Instruments** has developed an output vs. speed curve for each sensor family. By looking at the application extremes of highest speed/lowest gap and lowest speed/highest gap, the full variation of sensor output can easily be determined. We also specify each family in two ways: ***Standard*** - minimum output voltage at 1000 IPS, 0.005 in. gap. ***Guarantee Point*** - minimum output voltage at 500 IPS, 0.030 in. gap. Sensors with .187” dia. pole piece are tested with an 8 D.P. gear, 100k ohms load; .106” dia. & smaller pole piece sensors are tested with a 20 D.P. gear, 100k ohms load. Sensors with connectors also use a 250 pf capacitor shunted across the load.

Calculation of Output Voltage

Selection of the proper **AI-Tek** magnetic sensor may require the calculation of sensor output voltage to assure proper operation in your specific application. To assist in this area, let us consider the following typical application: Requirement is speed display with overspeed and underspeed control as well as 4-20 mA signal to a PLC. Speed range is 0-3600 RPM with low speed set point at 300 RPM, available shaft diameter for mounting a gear is 2.000 in. and a .030 in. air gap is ideal.

You have selected a Tachtrol 30, P/N T77630-10, with a 60T steel, split gear, P/N G79870-202-1901, and you are considering to use sensor P/N 70085-1010-001. The question is if the sensor has enough output voltage at 300 RPM.

We can list the following parameters:

a. Tachtrol 30: Load impedance - 12k-ohms
   Sensitivity - 200 mV peak

b. Split gear: Outside dia. - 5.166 in.
   D.P. - 12
   No. of Teeth - 60

c. Sensor:
   Standard output voltage - 40V (P-P) min.
   Guarantee Point - 3.4V P-P min.
   D.C. Resistance - 130 ohms max.
   Typical inductance - 33 mH ref.

Step 1: Calculate surface speed of gear:

$$SS = \frac{RPM \times Outside\ Dia. \times \pi}{60} = \frac{300 \times 5.166 \times 3.14}{60} \qquad SS = 81\ IPS$$

Step 2: Determine Peak-to-Peak output voltage:
Referring to the performance curves of sensor P/N 70085-1010-001 the min. output voltage is approx.0.3 V (P-P) at 81 IPS and 0.030 in. gap. It is a fact that output voltage vs. surface speed is a near linear function; therefore, another method of determining output voltage is to set up a ratio using the guarantee point:

$$\frac{3.4V\ (P\text{-}P)}{500\ IPS} = \frac{E}{81} \qquad E = .55V\ (P\text{-}P)$$

Step 3: Correction for pitch:
For a 0.106 in. pole piece dia. and a 12 D.P. gear the correction factor from Table A is 1 .41. (See pg. 5)

$E_C = .55 \times 1.41 = .78\ V\ (P\text{-}P)$

Step 4: Converting to peak voltage: Simply divide by 2. $E_C = .78 \div 2 = .39V$ peak.

Step 5: Correction for load:
The .39V or 390mV sensor output voltage will be divided across the impedance of the load and sensor. The load impedance is 12000 ohms resistive. The impedance of the sensor has a resistive and inductive element. At low frequencies the inductive element is very small and can therefore be disregarded, leaving the max. DC resistance of 130 ohms for consideration.

The load correction factor (f_L) can be expressed as:

$$(f_L) = \frac{Z\ (load)}{Z\ (load) + Z\ (sensor)} = \frac{12000}{12130} = .99$$

$E_C = .99 \times 390 = 386$ mV peak

The final adjusted value is 386 mV peak

As stated earlier, the sensitivity or threshold of the Tachtrol 30 is 200mV peak at the stated conditions, the selection of P/N 70085-1010-001 is acceptable.

By setting up ratios, you can determine that the minimum sensed speed is 155 RPM.

If the final value of E_C had been slightly less than 200 mV, a reduction of the air gap (from .030" to .025") would boost the output above 200 mV.

If it should be determined that the required sensor cannot be selected from the catalog models, the best procedure is to compile a list of all your requirements and contact your area distributor to assist you in the selection of the correct sensor.

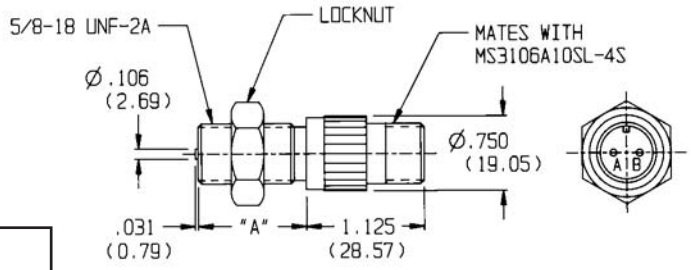
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Passive Speed Sensors

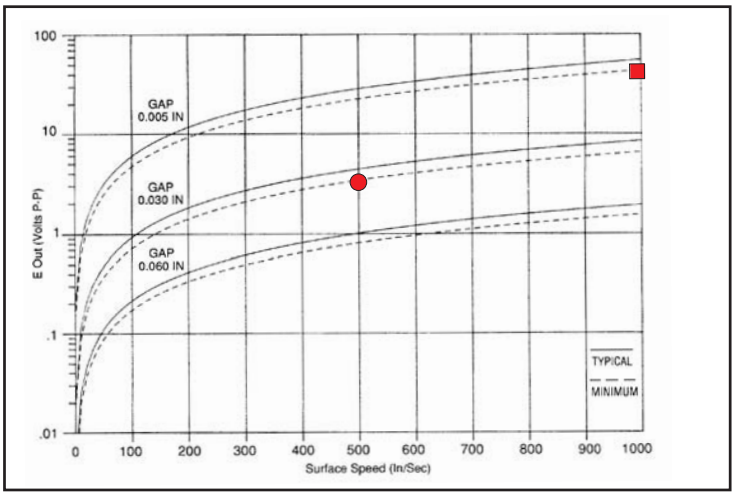
General Purpose

Ordering Part #	Thread Length (A)	
70085-1010-001	1.125	(28.57)
70085-1010-003	2.625	(66.67)
70085-1010-018	3.625	(92.07)
70085-1010-118	5.000	(127.00)

(Select cable from group “A”, see index)



Performance Curves



Based on 20 D.P. Gear

Specifications:

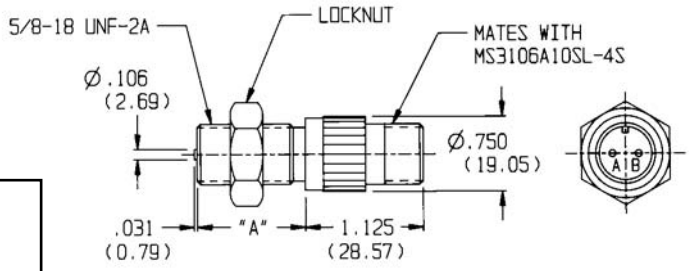
- ■ Output Voltage (Standard): 40 V (P-P)
- ● Output Voltage (Guarantee Point): 3.4 V (P-P)

DC Resistance: 130 ohms max.
Typical Inductance: 33 mH ref.
Output Polarity: Pin ‘B’ positive
Operating Temperature: -55 to +107°C
Net Weight: 5 oz. max.

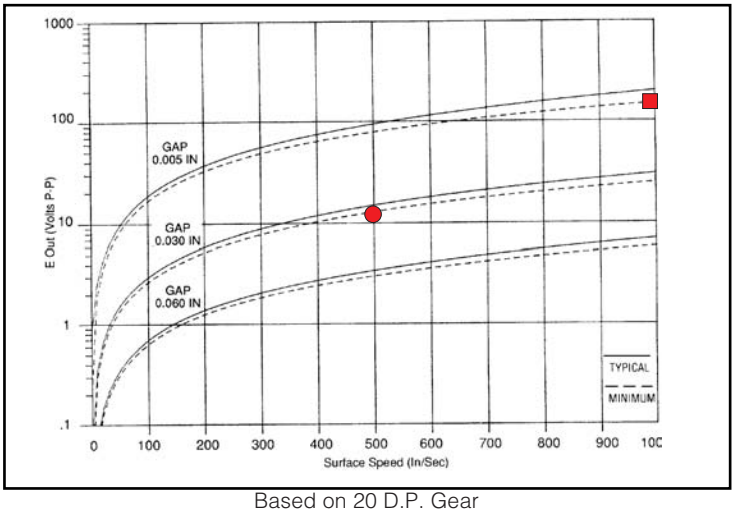
High Sensitivity

Ordering Part #	Thread Length (A)	
70085-1010-002	1.125	(28.57)
70085-1010-175	2.625	(66.67)
70085-1010-026	3.625	(92.07)
70085-1010-408	5.000	(127.00)

(Select cable from group “A”, see index)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- ■ Output Voltage (Standard): 150 V (P-P)
- ● Output Voltage (Guarantee Point):12.9 V (P-P)

DC Resistance: 1500 ohms max.
Typical Inductance: 360 mH ref.
Output Polarity: Pin ‘B’ positive
Operating Temperature: -55 to +107°C
Net Weight: 5 oz. max.

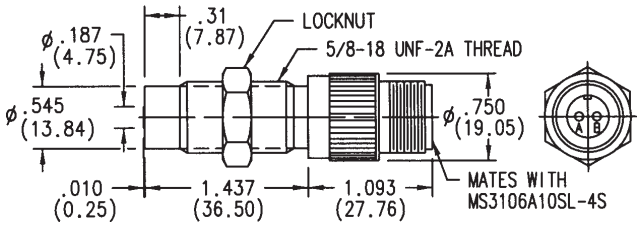
Dimensions in inches and (mm).

Passive Speed Sensors

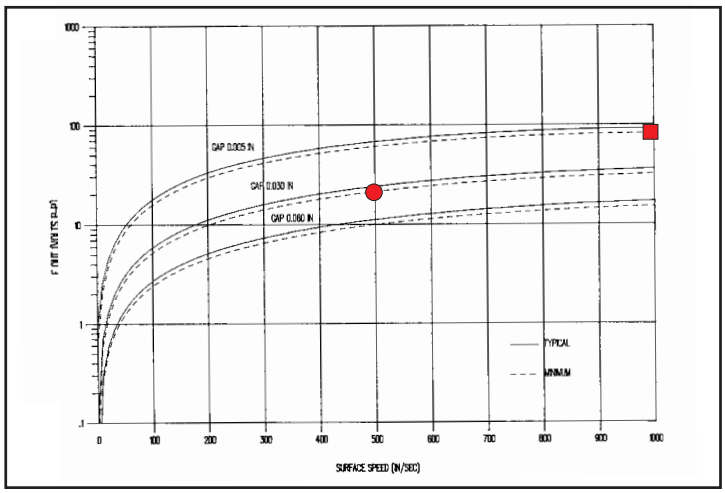
Power Output

Ordering Part #	Thread Length (A)	
70085-1010-028	1.437	(36.50)

(Select cable from group “A”, see index)



Performance Curves



Based on 8 D.P. Gear

Specifications:

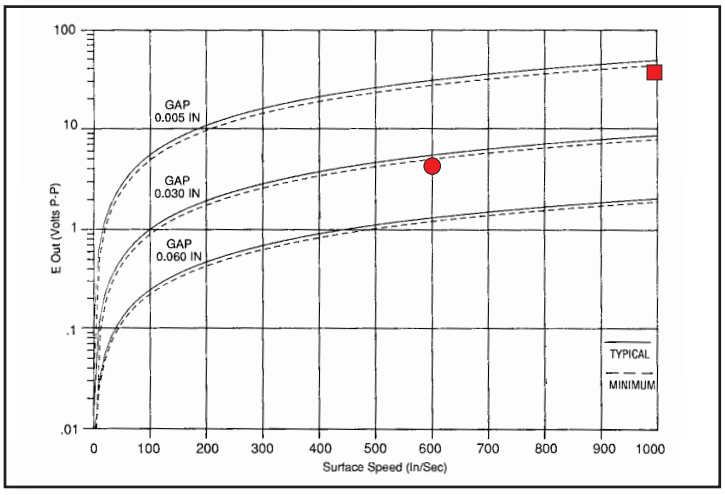
- ■ Output Voltage (Standard): 75 V (P-P)
- ● Output Voltage (Guarantee Point): 21.5 V (P-P)

DC Resistance: 210 ohms max.
Typical Inductance: 50 to 95 mH ref.
Output Polarity: Pin "B" positive
Operating Temperature: -73 to +107° C
Net Weight: 2.2 oz. max.

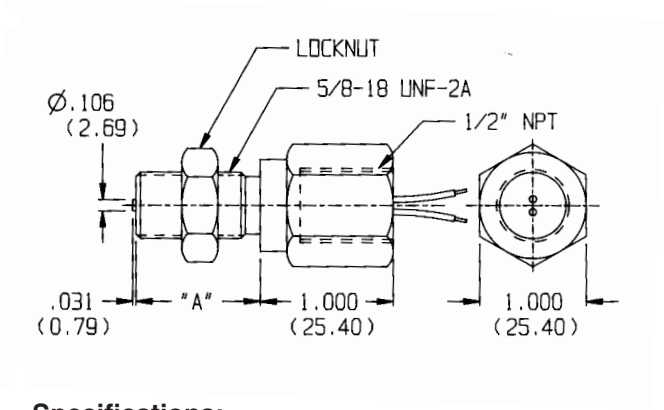
Conduit Fitting – General Purpose

Ordering Part #	Thread Length (A)	
70085-1010-004	1.125	(28.57)
70085-1010-469	2.750	(69.85)

Performance Curves



Based on 20 D.P. Gear



Specifications:

- ■ Output Voltage (Standard): 43 V (P-P)
- ● Output Voltage (Guarantee Point): 4.3 V (P-P)

DC Resistance: 130 ohms max.
Typical Inductance: 32-46 mH ref.
Output Polarity: Red lead positive
Operating Temperature: -73 to +107°C
Lead length: 10 ft (3.05 m)
Net Weight: 16 oz. max.

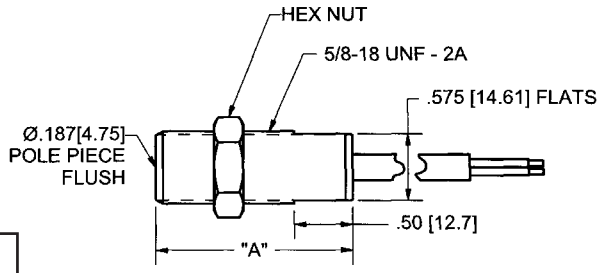
Dimensions in inches and (mm).

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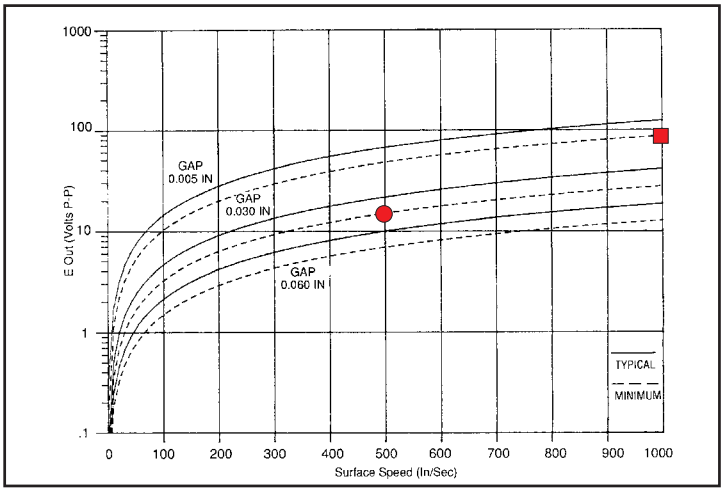
Passive Speed Sensors

Full Thread – Power Output

Ordering Part #	Thread Length (A)	
70085-1010-131	1.687	(42.85)
70085-1010-214	2.937	(74.60)



Performance Curves



Based on 8 D.P. Gear

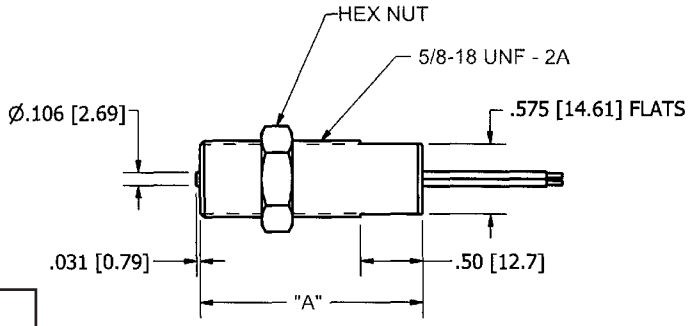
Specifications:

- Output Voltage (Standard): 120 V (P-P)
- Output Voltage (Guarantee Point):15.1 V (P-P)

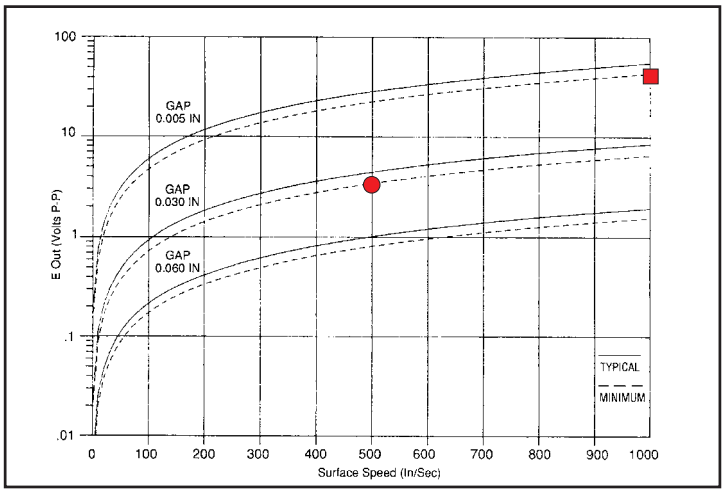
DC Resistance: 220 ohms max.
Typical Inductance: 40-60 mH ref.
Output Polarity: White lead positive
Operating Temperature: -55 to +107° C
Cable Length: 10 ft (3.05 m)
Net Weight: 5 oz. max.

Full Thread – General Purpose

Ordering Part #	Thread Length (A)	
70085-1010-078	1.812	(46.02)
70085-1010-137	2.937	(74.60)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- Output Voltage (Standard): 40 V (P-P)
- Output Voltage (Guarantee Point): 3.4 V (P-P)

DC Resistance: 130 ohms max.
Typical Inductance: 33 mH ref.
Output Polarity: white lead positive
Operating Temperature: -55 to +107°C
Lead Length: -078, 12 in (30.5 cm)
-137, 24 in (60.9 cm)
Net Weight: 3 oz. max.

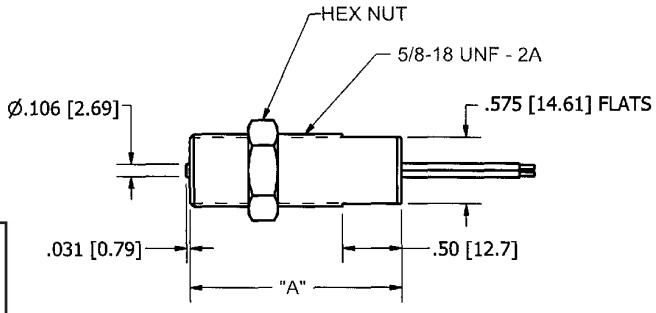
Dimensions in inches and (mm).

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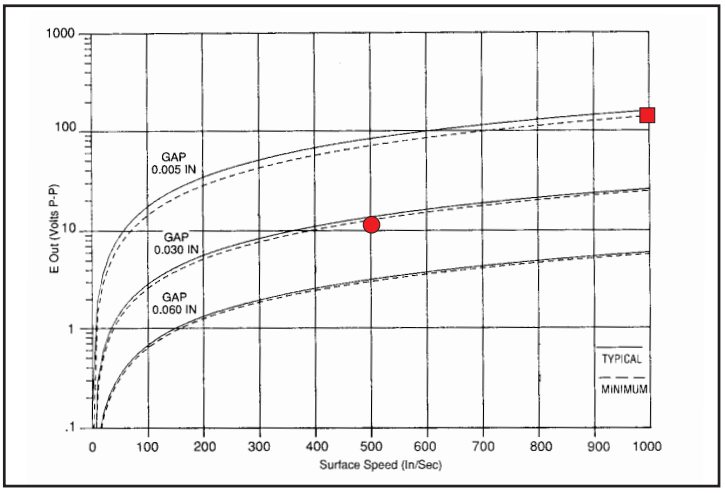
Passive Speed Sensors

Full Thread – High Sensitivity

Ordering Part #	Thread Length (A)	
70085-8080-003	1.812	(46.03)
70085-1010-220	2.937	(74.60)



Performance Curves



Based on 20 D.P. Gear

Specifications:

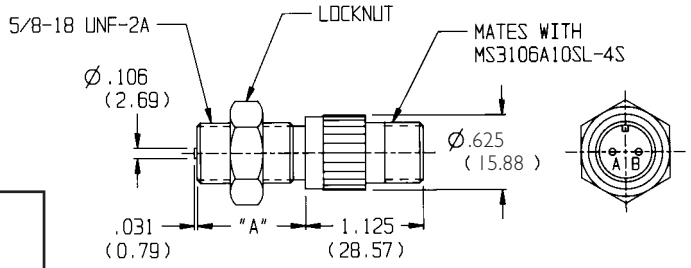
- Output Voltage (Standard): 150 V (P-P)
- Output Voltage (Guarantee Point): 12.8 V (P-P)

DC Resistance: 1650 ohms max.
Typical Inductance: 500 mH ref.
Output Polarity: White lead positive
Operating Temperature: -55 to + 107°C
Lead Length: -003, 12 in (30.5 cm)
-220, 36 in (91.4 cm)
Net Weight: 3 oz. max.

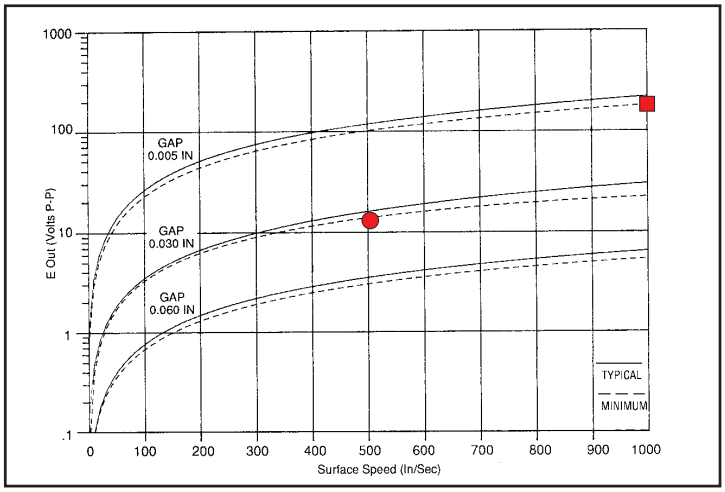
Molded – High Sensitivity

Ordering Part #	Thread Length (A)	
70084-1713-111	1.125	(28.57)

(Select cable from group "A", see index)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- Output Voltage (Standard): 190 V (P-P)
- Output Voltage (Guarantee Point): 13.9 V (P-P)

DC Resistance: 1200 ohms max.
Typical Inductance: 400 mH ref.
Output Polarity: Pin 'B' positive
Operating Temperature: -40 to +150° C
Net Weight: 2 oz. max.

Dimensions in inches and (mm).

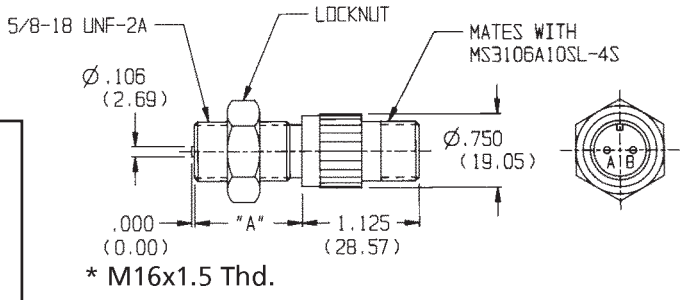
AI-Tek Instruments, Cheshire, CT USA

Passive Speed Sensors

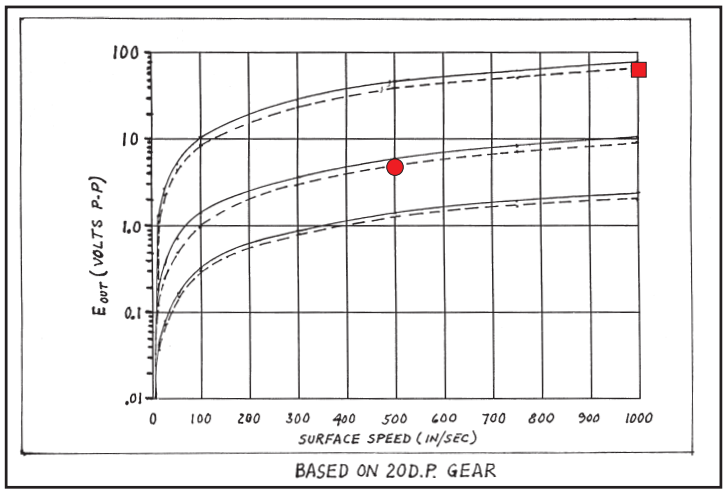
Molded

Ordering Part #	Thread Length (A)	
70085-1010-421	2.475	(62.87)
70085-1010-425	3.000	(76.20) * M16 x 1.5 Thd.
70085-1010-424	4.493	(114.12)

(Select cable from group “A”, see index)



Performance Curves **



Specifications:

- ■ Output Voltage (Standard): 63 V (P-P)
- ● Output Voltage (Guarantee Point): 4.9V (P-P)

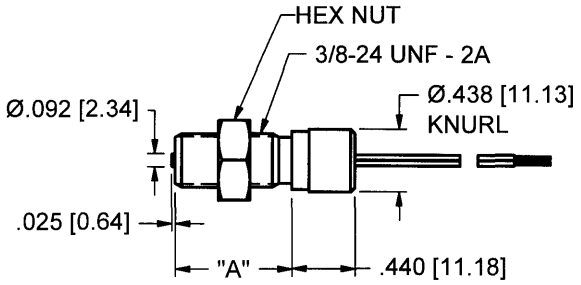
DC Resistance: 250 ohms max.
Typical Inductance: 63 mH ref.
Output Polarity: Pin ‘B’ positive
Operating Temperature: -55 to +107° C
Net Weight: 5 oz. max.

Dimensions in inches and (mm).

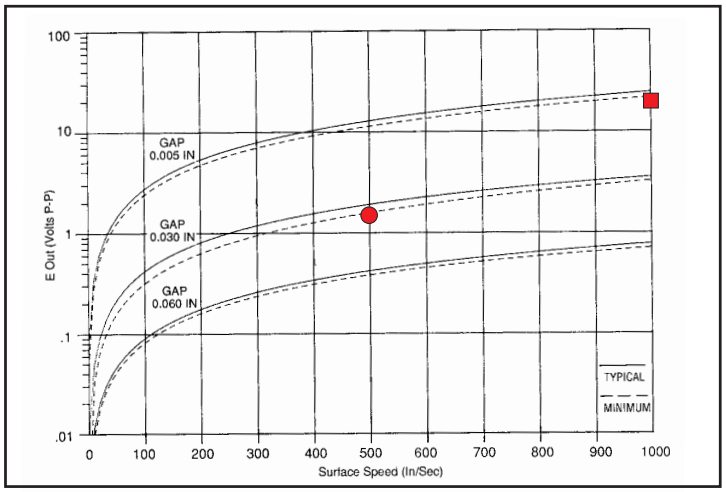
Passive Speed Sensors

General Purpose

Ordering Part #	Thread Length (A)	
70085-1010-007	.812	(20.62)
70085-1010-056	3.625	(92.08)



Performance Curves



Based on 20 D.P. Gear

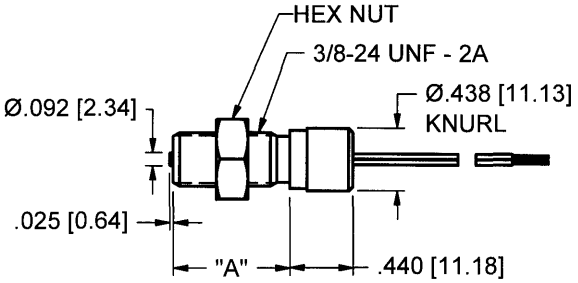
Specifications:

- Output Voltage (Standard): 21 V (P-P)
- Output Voltage (Guarantee Point): 1.6 V (P-P)

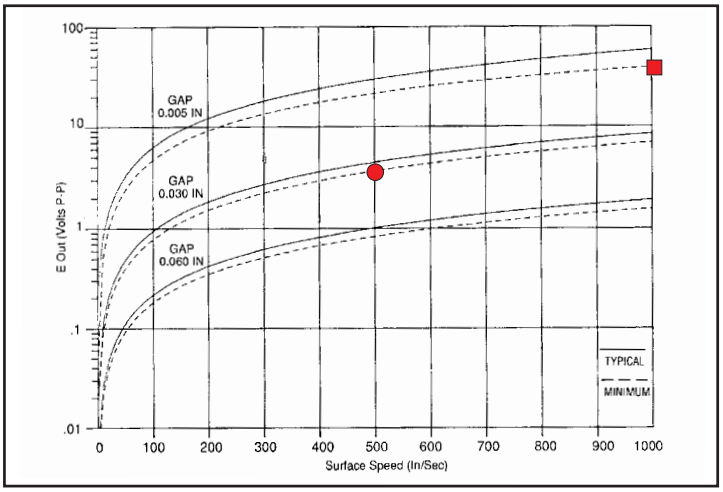
DC Resistance: 115 ohms max.
Typical Inductance: 22 mH ref.
Output Polarity: White lead positive
Operating Temperature: -55 to +107°C
Lead Length: 6 in (15.2 cm)
Net Weight: 2 oz. max.

High Sensitivity

Ordering Part #	Thread Length (A)	
70085-1010-086	.812	(20.62)
70085-1010-355	.812	(20.62)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- Output Voltage (Standard): 55 V (P-P)
- Output Voltage (Guarantee Point): 3.6V (P-P)

DC Resistance: 700 ohms max.
Typical Inductance: 125 mH ref.
Output Polarity: White lead positive
Operating Temperature: -55 to +107°C
Lead Length: -086, 18 in (45.7 cm)
Cable Length: -355, 40 in (101.6 cm)
Net Weight: 2 oz. max.

Dimensions in inches and (mm).

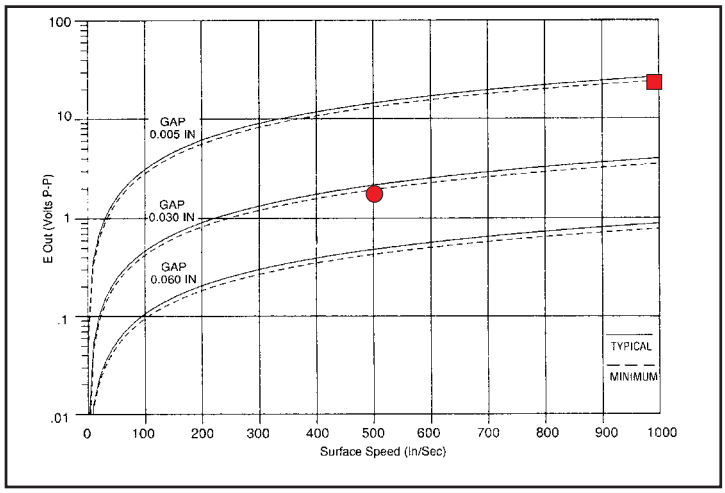
AI-Tek Instruments, Cheshire, CT USA

Passive Speed Sensors

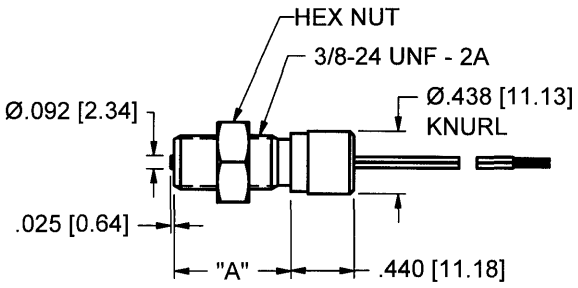
General Purpose – High Temperature

Ordering Part #	Thread Length (A)	
70085-1010-041	.812	(20.62)
70085-1010-428	1.500	(38.10)
70085-1010-458	3.625	(92.08)

Performance Curves



Based on 20 D.P. Gear



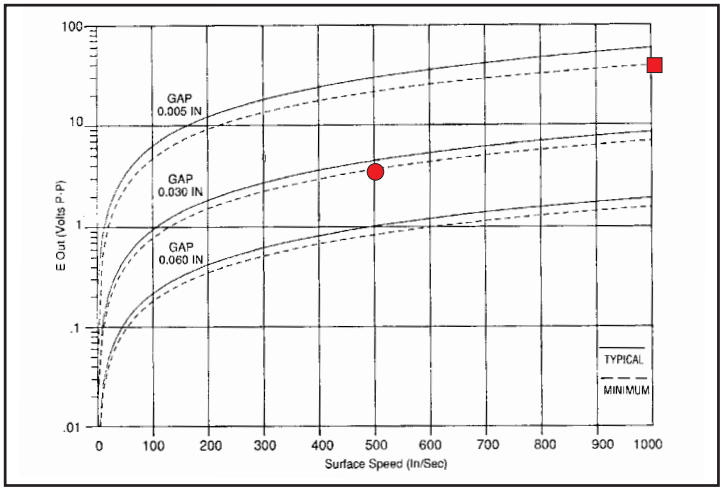
Specifications:

- ■ Output Voltage (Standard): 24 V (P-P)
- ● Output Voltage (Guarantee Point): 2.0 V (P-P)
- DC Resistance: 110 ohms max.
- Typical Inductance: 21 mH ref.
- Output Polarity: White lead positive
- Operating Temperature: -73 to +232°C
- Lead Length: 40 in (1 m)
- Net Weight: 2 oz. max.

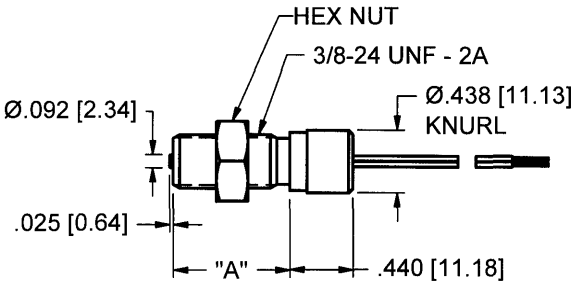
High Sensitivity - High Temperature

Ordering Part #	Thread Length (A)	
70085-1010-174	.812	(20.62)

Performance Curves



Based on 20 D.P. Gear



Specifications:

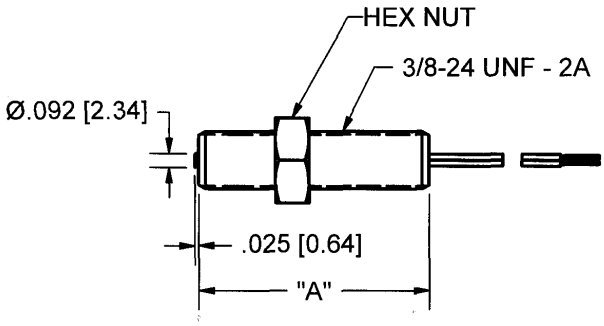
- ■ Output Voltage (Standard): 55 V (P-P)
- ● Output Voltage (Guarantee Point): 3.6V (P-P)
- DC Resistance: 700 ohms max.
- Typical Inductance: 125 mH ref.
- Output Polarity: White lead positive
- Operating Temperature: -65 to +220°C
- Cable Length: 60 in (1.5 m)
- Net Weight: 2 oz. max.

Dimensions in inches and (mm).

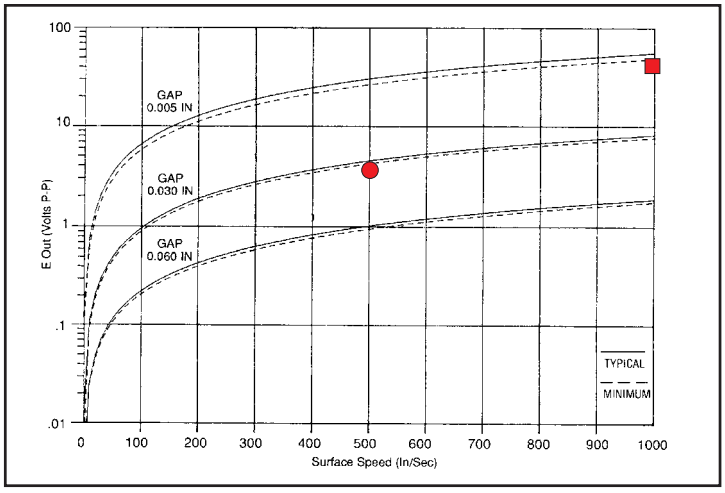
Passive Speed Sensors

Full Thread – High Sensitivity

Ordering Part #	Thread Length (A)	
70085-8080-001	1.500	(38.10)



Performance Curves



Based on 20 D.P. Gear

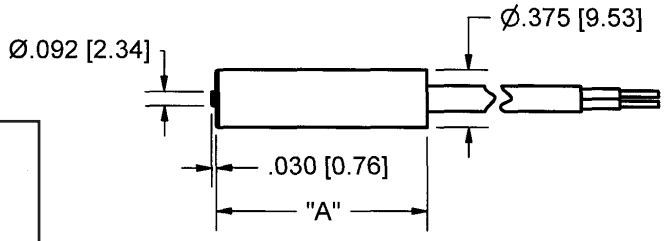
Specifications:

- Output Voltage (Standard): 55 V (P-P)
- Output Voltage (Guarantee Point): 4.2 V (P-P)

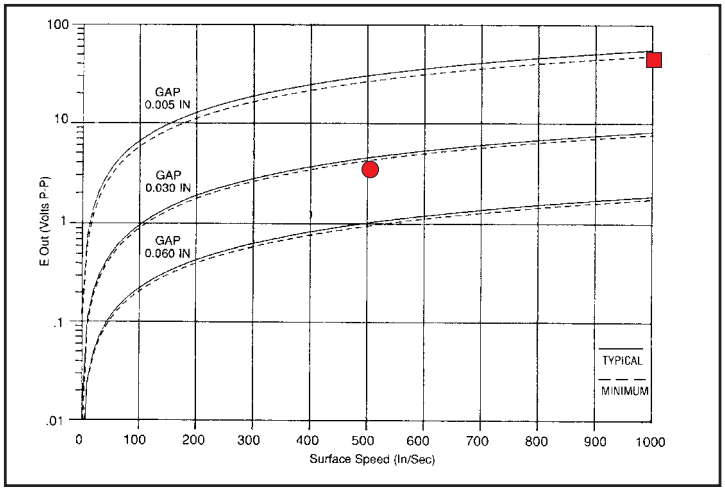
DC Resistance: 700 ohms max.
Typical Inductance: 125 mH ref.
Output Polarity: White lead positive
Operating Temperature: -55 to + 107°C
Lead Length: 6 in (15.2cm)
Net Weight: 1 oz. max.

Smooth Body – High Sensitivity

Ordering Part #	Length (A)	
70085-1010-314	1.375	(34.93)
70085-8080-004	2.500	(63.50)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- Output Voltage (Standard): 55 V (P-P)
- Output Voltage (Guarantee Point): 4.2 V (P-P)

DC Resistance: 700 ohms max.
Typical Inductance: 125 mH ref.
Output Polarity: White lead positive
Operating Temperature: -30 to +85°C
Lead Length: -004, 6 in (15.2cm)
Cable Length: -314, 10ft (3.05m)
Net Weight: 3 oz. max.

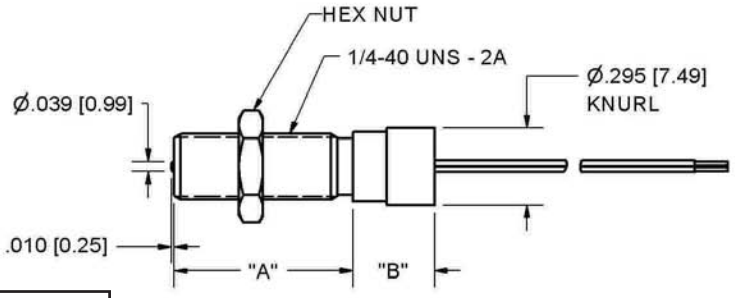
Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

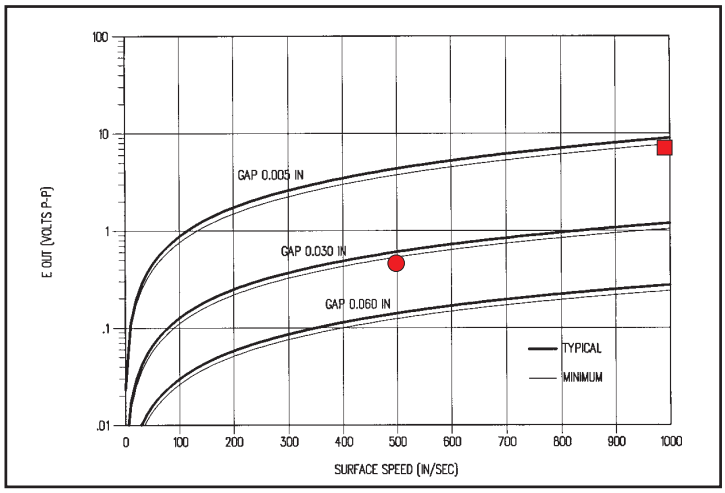
Passive Speed Sensors

General Purpose - High Temperature

Ordering Part #	Thread Length (A)		(B)	
70085-1010-024	.687	(17.45)	.313	(7.95)
70085-1010-472 *	.687	(17.45)	.500	(12.70)
70085-1010-227	1.687	(42.85)	.313	(7.95)



Performance Curves



Based on 20 D.P. Gear

Specifications:

- ■ Output Voltage (Standard): 4.7 V (P-P)
- ● Output Voltage (Guarantee Point): 0.4 V (P-P)

DC Resistance: 125 ohms max.
Typical Inductance: 5-12 mH ref.
Output Polarity: White lead positive
Operating Temperature: -73 to 232°C
Lead Length: 8 in (20.3 cm)
Cable Length: -472, 60 in (1.5 m) *
Net Weight: 2 oz. max.

* Egress is a 2-conductor, AWG #26, shielded, Teflon cable, with 3.25" long shrink tubing over housing and cable for extra protection. Extra locknut provided.

AI-Tek Instruments, Cheshire, CT USA

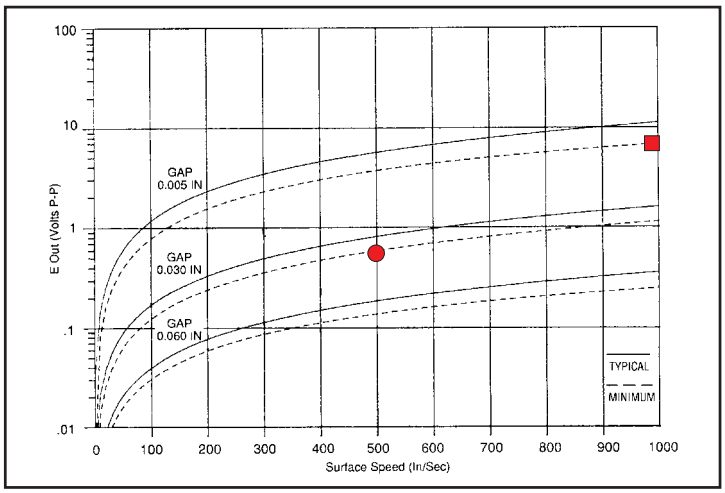
Dimensions in inches and (mm).

Passive Speed Sensors

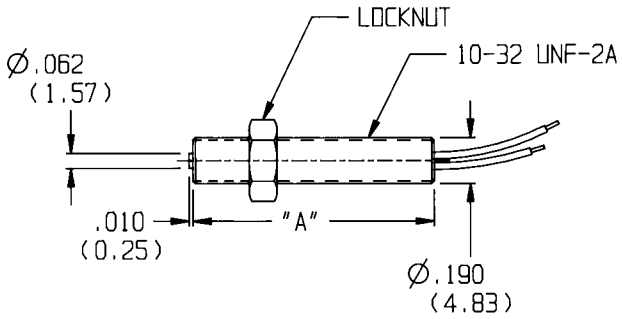
High Sensitivity

Ordering Part #	Thread Length (A)	
70085-1010-037	.500	(12.70)
70085-1010-299	1.250	(31.75)

Performance Curves



Based on 20 D.P. Gear



Specifications:

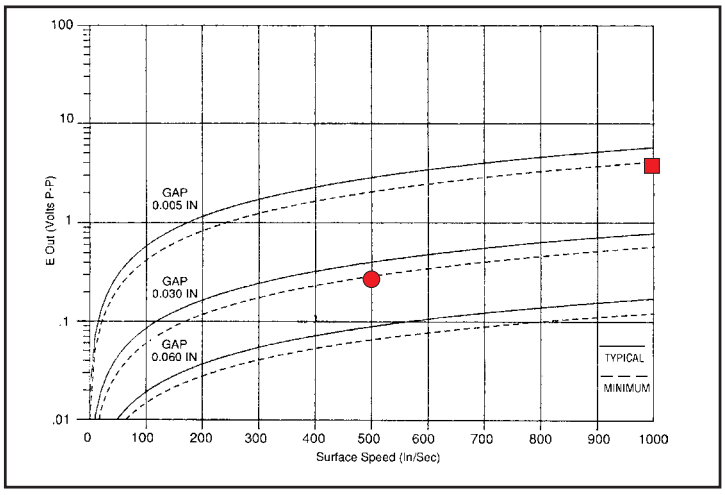
- ■ Output Voltage (Standard): 13 V (P-P)
- ● Output Voltage (Guarantee Point): .6 V (P-P)

DC Resistance: 190 ohms max.
Typical Inductance: 10 mH, ref.
Output Polarity: White lead positive
Operating Temperature: -55 to +107°C
Lead Length: 18 in (45.7 cm)
Net Weight: 1 oz. max.

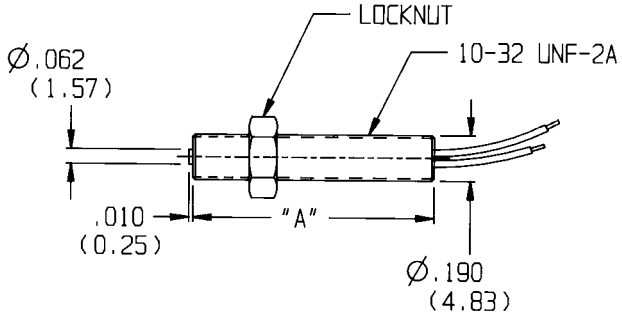
General Purpose – High Temperature

Ordering Part #	Thread Length (A)	
70085-1010-182	.500	(12.70)
70085-1010-289	1.250	(31.75)

Performance Curves



Based on 20 D.P. Gear



Specifications:

- ■ Output Voltage (Standard): 6 V (P-P)
- ● Output Voltage (Guarantee Point): .3 V (P-P)

DC Resistance: 45 ohms max.
Typical Inductance: 2 mH, ref.
Output Polarity: White lead positive
Operating Temperature: -73 to +150°C
Lead Length: 18 in (45.7 cm)
Net Weight: 1 oz. max.

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

Passive Speed Sensors

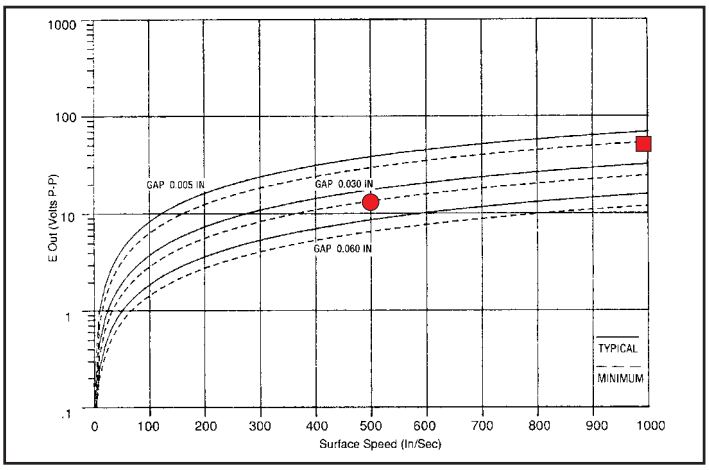
LISTED PRODUCT

UL/CSA Sensors

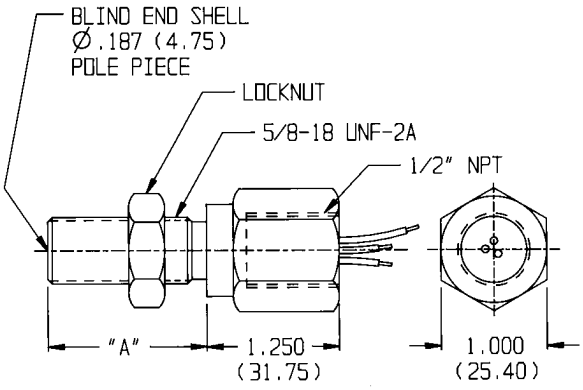
Ordering Part #	Thread Length (A)	
70085-1010-081	1.500	(38.10)
70085-1010-411	1.875	(47.63)
70085-1010-329	2.750	(69.85)
70085-1010-330	4.000	(101.60)
70085-1010-412	6.000	(152.40)

Rating: UL and CSA listed for hazardous locations. Class I, Div 1, Groups A, B, C & D; Class II, Div 1, Groups E, F ,G. Temp Code T3C.
Consult factory for ATEX listing.

Performance Curves



Based on 8 D.P. Gear



Specifications:

- Output Voltage (Standard): 54 V (P-P)
- Output Voltage (Guarantee Point):13.4 V (P-P)

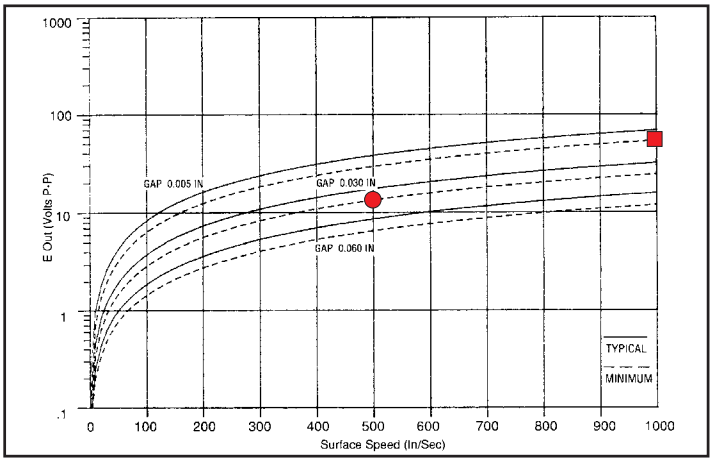
DC Resistance: 240 ohms max.
Typical Inductance: 30 mH ref.
Output Polarity: White lead positive
Operating Temperature: -65 to 100°C
Lead Length: 10 ft (3.05 m)
Housing Ground: Green/Yellow Tracer
Net Weight: 14 oz. max.

UL/CSA Sensors

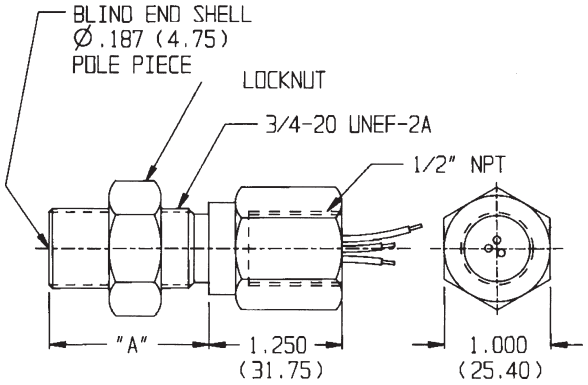
Ordering Part #	Thread Length (A)	
70085-1010-413	1.500	(38.10)
70085-1010-005	1.875	(47.63)
70085-1010-327	2.750	(69.85)
70085-1010-328	4.000	(101.60)
70085-1010-414	6.000	(152.40)

Rating: UL and CSA listed for hazardous locations. Class I, Div 1, Groups A, B, C & D; Class II, Div 1, Groups E, F ,G. Temp Code T3C.
Consult factory for ATEX listing.

Performance Curves



Based on 8 D.P. Gear



Specifications:

- Output Voltage (Standard): 54 V (P-P)
- Output Voltage (Guarantee Point):13.4 V (P-P)

DC Resistance: 240 ohms max.
Typical Inductance: 30 mH ref.
Output Polarity: White lead positive
Operating Temperature: -65 to +100°C
Lead Length: 10 ft (3.05 m)
Housing Ground: Green/Yellow Tracer
Net Weight: 14 oz. max.

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

Passive Speed Sensors

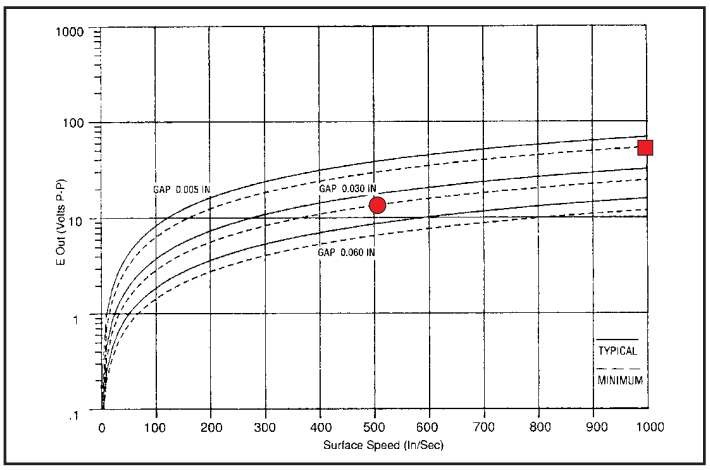
LISTED PRODUCT

FM Sensors

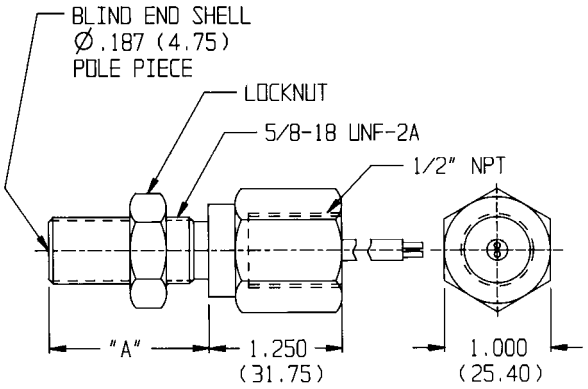
Ordering Part #	Thread Length (A)	
70085-1010-404	1.500	(38.10)
70085-1010-406	2.750	(69.85)
70085-1010-417	4.000	(101.60)
70085-1010-420	6.000	(152.40)

Rating: FM listed for hazardous location.
Class I, Div 1, Group D.
Consult factory for ATEX listing.

Performance Curves



Based on 8 D.P. Gear



Specifications:

- Output Voltage (Standard): 60V (P-P)
- Output Voltage (Guarantee Point): 13.4V (P-P)

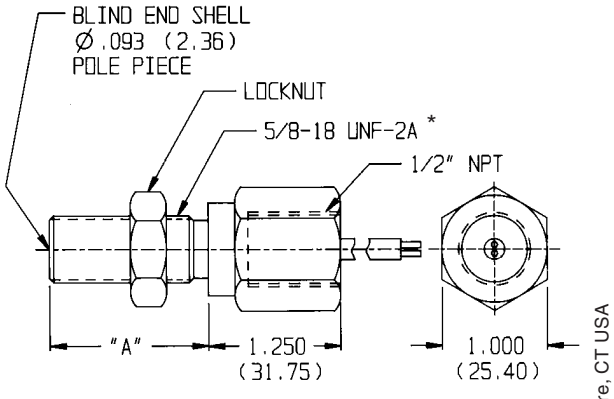
DC Resistance: 210 ohms max.
Typical Inductance: 75 mH max.
Output Polarity: White lead positive
Operating Temperature: -55 to +220°C
Cable Length: 15 ft. (4.57m)
Net Weight: 16 oz. max.

FM Sensors

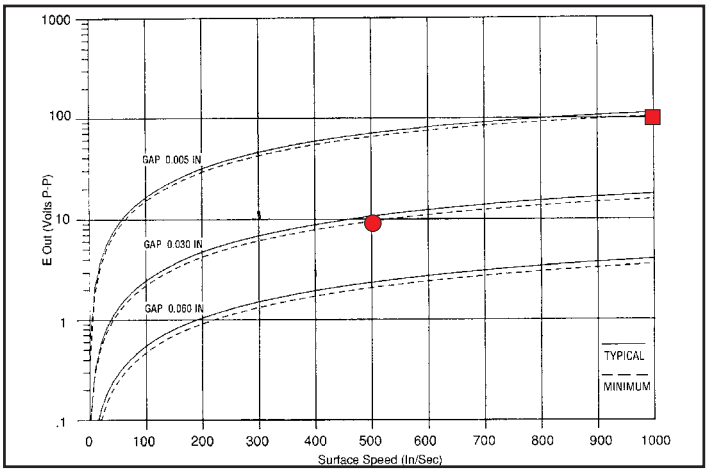
Ordering Part #	Thread Length (A)	
70085-1010-403	1.500	(38.10)
70085-1010-405	2.750	(69.85)*
70085-1010-415	4.000	(101.60)
70085-1010-416	6.000	(152.40)

Rating: FM listed for hazardous location.
Class I, Div 1, Group D.
Consult factory for ATEX listing.

*3/4 - 20 THD.



Performance Curves



Based on 20 D.P. Gear

Dimensions in inches and (mm).

Specifications:

- Output Voltage (Standard): 90 V (P-P)
- Output Voltage (Guarantee Point): 9.4 V (P-P)

DC Resistance: 750 ohms max.
Typical Inductance: 210 mH max.
Output Polarity: White lead positive
Operating Temperature: -55 to +232° C
*Mounting Thread: -0405, 3/4 - 20 UNEF-2A
Cable Length: 15 ft (4.57 m)
Net Weight: 16 oz. max.

AI-Tek Instruments, Cheshire, CT USA

AI-Tek Instruments, LLC
Side Look Sensor

Application:
Used for Speed Take Off



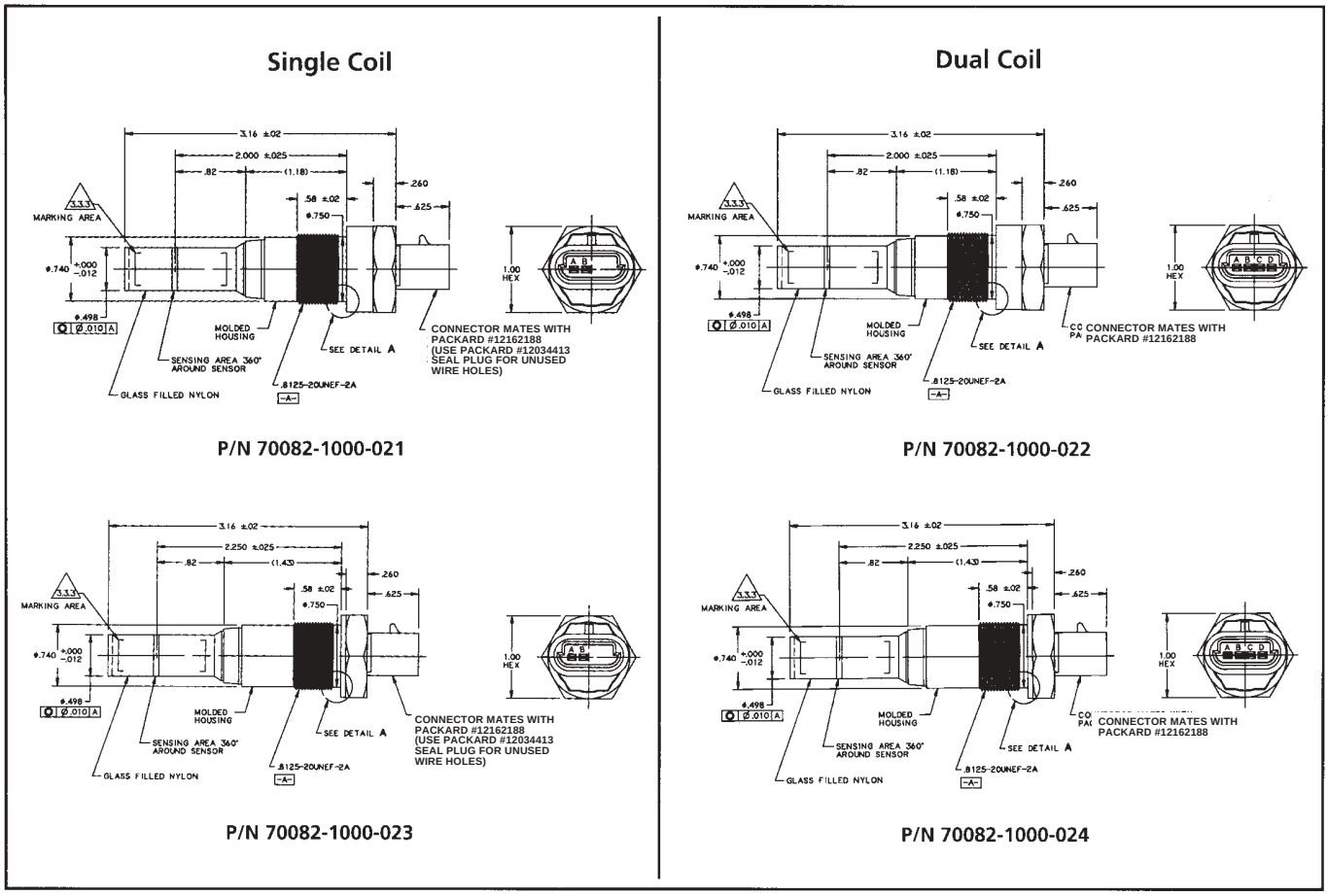
The Side Look Sensor (SLS) has been developed by AI-Tek Instruments for Allison automatic transmissions for trucks ranging from light duty vans to over-the-road tractors. It is available for Allison AT, MT and HT transmissions. The new SLS improves on earlier designs developed for Allison to replace a mechanical speed system.

The SLS is a variable reluctance device that provides electronic transmission speed inputs to engine control systems and/or electronic dashboards. It mounts directly on the transmission and employs a unique magnet configuration that induces a magnetic field on the side of the sensor in the path of the rotating transmission gear. This system with its fewer mounting parts improves reliability, reduces weight and conserves space over the earlier designs.

The new SLS uses a molded, glass filled nylon body to protect the sensor in harsh, truck-operating environments. It replaces the old fly-lead design with an integral standard Packard connector, which eliminates the added extra connector cost of the old design. It is available in single and dual output versions.

The SLS is manufactured in the United States. AI-Tek Instruments Distributors stock the SLS for off-the-shelf maintenance, repair and overhaul (MRO) requirements.

Outline and Mounting Dimensions



Specifications

Characteristics

Physical

Weight: 55 gm typical.
Body: Black, molded thermoplastic.

Electrical

All measurements at 25°C.

Output:

Single Coil: .67 Volts peak-to-peak, A to B
Dual Coil: .35 Volts peak-to-peak, A to B and C to D, Sensing a 16 tooth wheel, 2.208" diameter at 100 rpm and .040 inch air gap.

DC Resistance

Single Coil: 3.17K ±10% ohms.
Dual Coil: 1206 ± 20% ohms each coil.

Inductance

Single Coil: 2.25 H typical.
Dual Coil: 620 mH typical.
Dielectric: 1000 VAC between terminals (shorted together) and body for 10 seconds .
.5 mA maximum leakage current.

Environmental

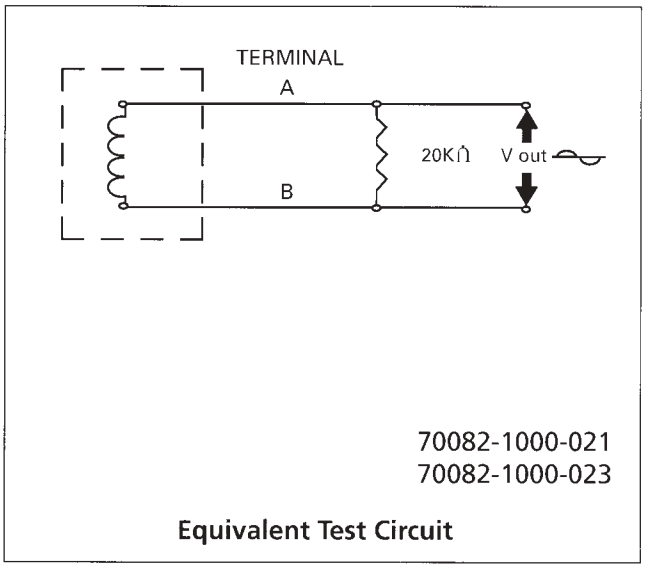
Temperature

Operating Temperature: -40°C to 150°C.
Storage Temperature: -40°C to 150°C.

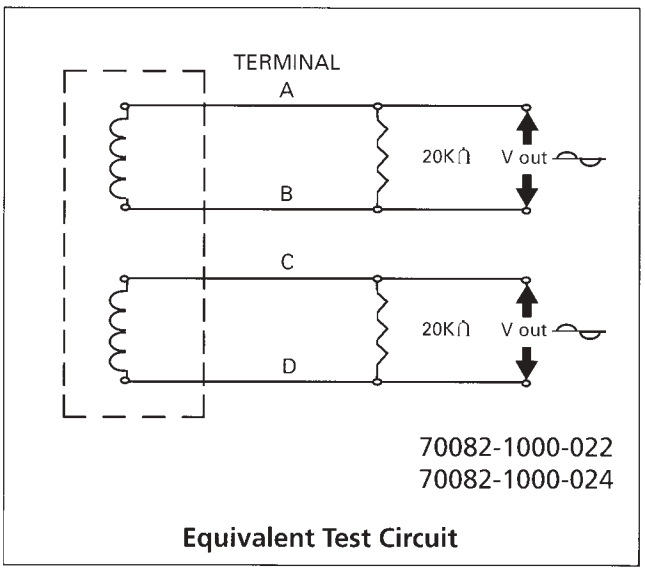
Connector

Single Coil: Mates with Packard #12162188. (Use Packard #12034413 seal plug for unused wire holes.)
Dual Coil: Mates with Packard #12162188.

Single Coil



Dual Coil



Applications	
P/N 70082-1000-021	AT, MT
P/N 70082-1000-022	AT, MT
P/N 70082-1000-023	HT
P/N 70082-1000-024	HT

AI-Tek Instruments, Cheshire, CT USA

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 24 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.

Our newest "RH" series sensors:

- No longer require special alignment
- Have improved duty cycle
- Have improved fine pitch performance
- Have increased air gaps

Refer to office when distance between sensor and tachometer is greater than 500 feet (150 meters).

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% ±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

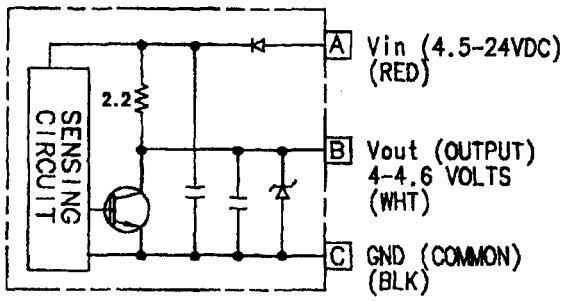
Housing:
300 series stainless steel

Leads:
AWG #24 Teflon, 200°C

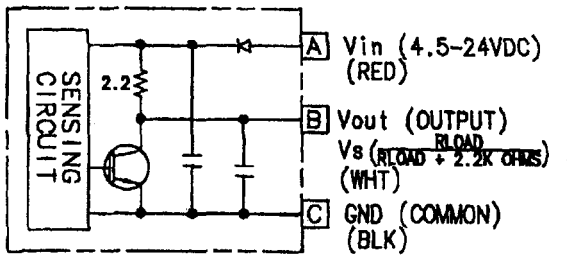
Cable:
AWG #20 Irradiated cross-linked polyolefin, 125°C

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

TTL Compatible Fig. 1



Supply Tracking Fig. 2

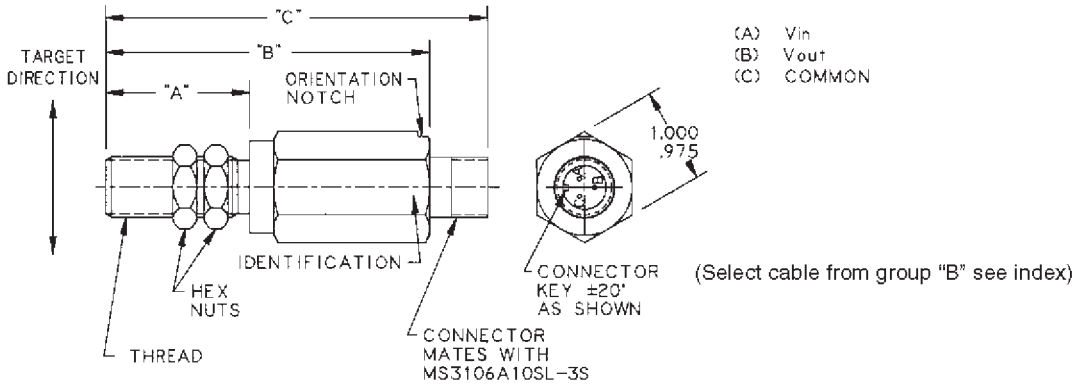


Note: Either output will work with any AI-Tek Tachometer.

AI-Tek Instruments, Cheshire, CT USA

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

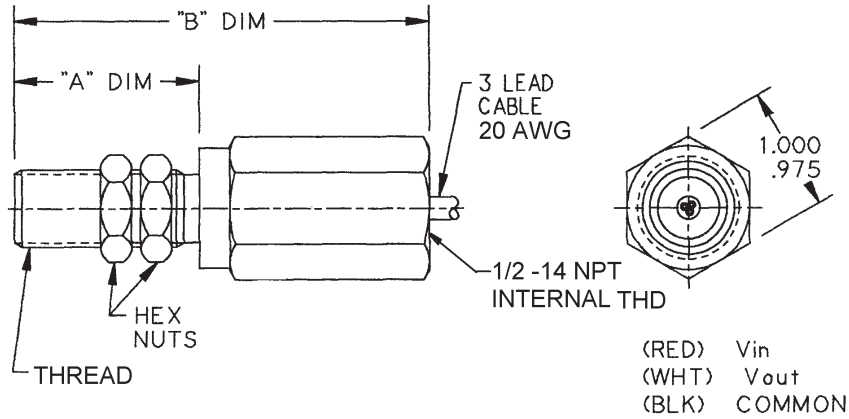
Hex Body with Connector



OBSOLETE SUPERSEDED BY:

Old Part Num.	Superseded By	Remarks
H1512-001	RH1512-005	See Page #24 For Configuration
H1522-001	RH1522-005	
H1512-002	RH1512-006	
H1522-002	RH1522-006	
H1612-001	RH1612-005	
H1622-001	RH1622-005	
H1612-002	RH1612-006	
H1622-002	RH1622-006	

Hex Body with Cable



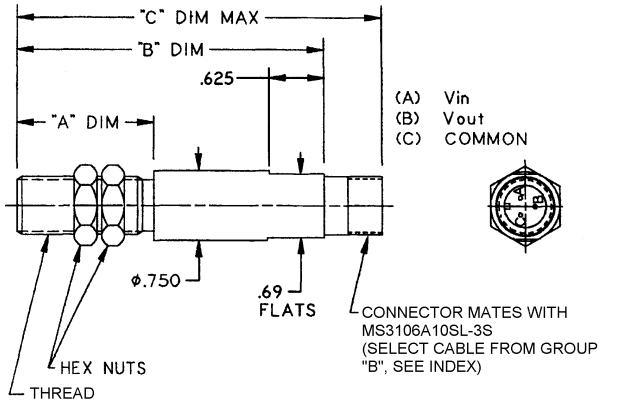
Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)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

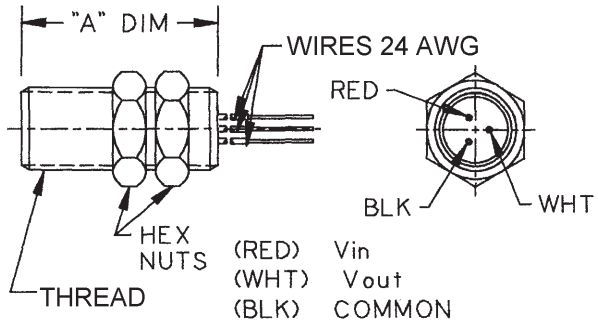
Round Body with Connector



Part Num.	Thread	"A" Dimension	"B" Dimension	"C" Dimension	Output
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

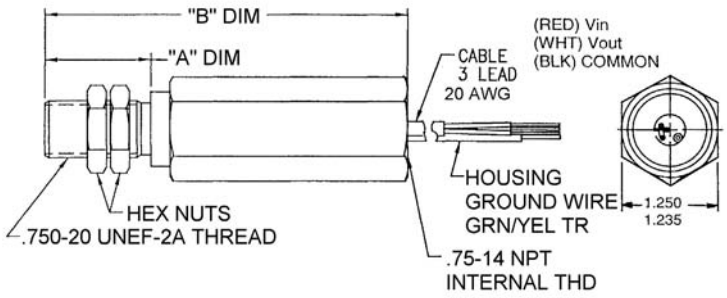
Net Weight: 3 oz. max.

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

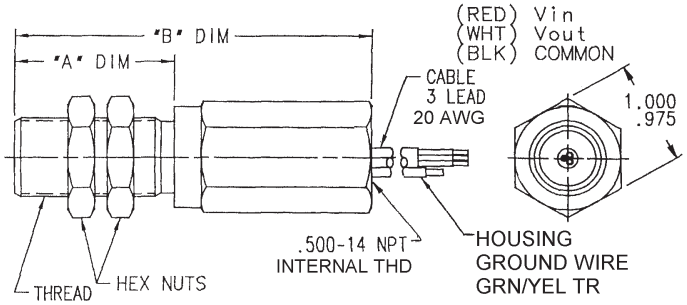
Zero Velocity - Magnetic Hall Effect Sensors - 5/8 and 3/4 Threads

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

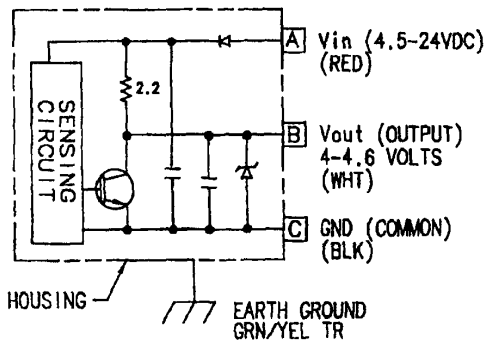
Rating: UL & CSA listed for hazardous locations. Class I, Div. 1, Groups A, B, C & D; Class II, Div., 1, Groups E, F & G. Temp Code T4A. Connect only to NEC Class 2 circuits.
Net Weight: 23 oz. max.



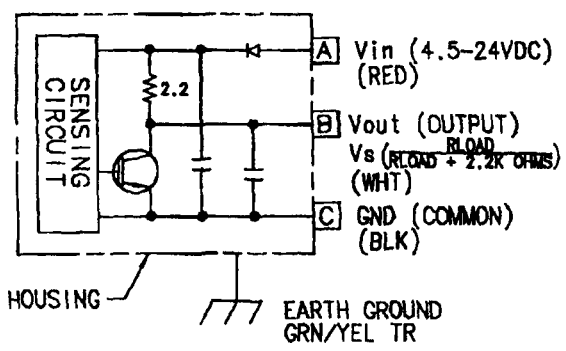
Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)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

TTL Compatible Fig. 1



Supply Tracking Fig. 2



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% ±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

Supply Tracking

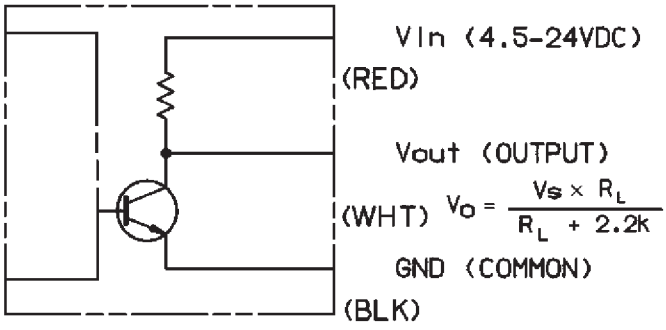


Figure 1

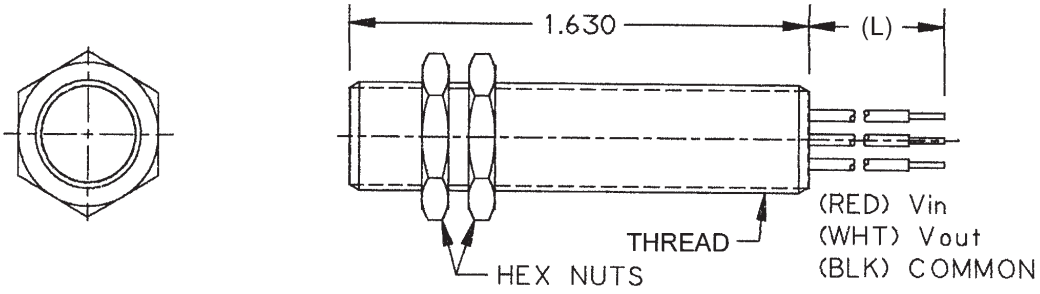
Note: Will work with any Al-Tek Tachometer.

Al-Tek Instruments, Cheshire, CT USA

Dimensions in inches and (mm).

Zero Velocity - Magnetic Hall Effect Sensors - 3/8 Diameter

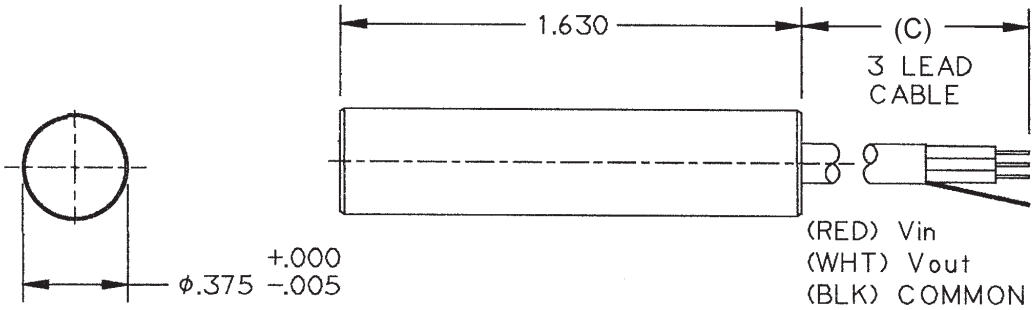
Fully Threaded



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

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)	—

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

Bi-Directional, Dual Channel, Hall Effect Speed Sensors

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.

AI-Tek Instruments, Cheshire, CT USA

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

Bi-Directional, Dual Channel, Hall Effect Speed Sensors

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 mμ/3mμ typical

Mechanical

Target Frequency: 0 to 15 kHz

Target Performance:

DIAMETRAL 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

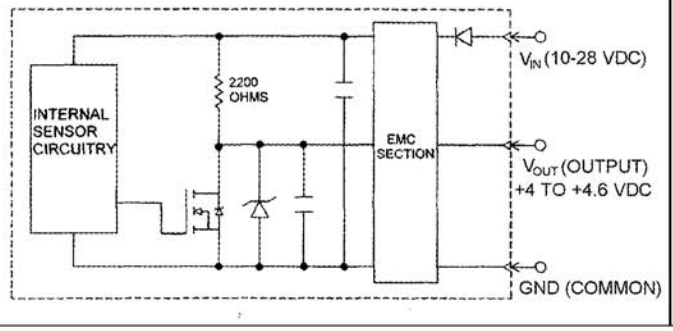
Materials

Housing:
300 series stainless steel

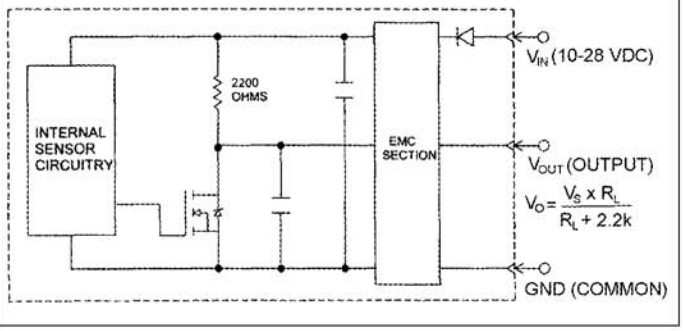
Cable:
AWG #22 Irradiated cross-linked polyolefin,
125°C, 5 lead wires

Channel phasing: 45° to 135°
Sensor must be aligned. Target rotation toward notch/flat results in Logic 1 direction output.

TTL Compatible Fig. 1



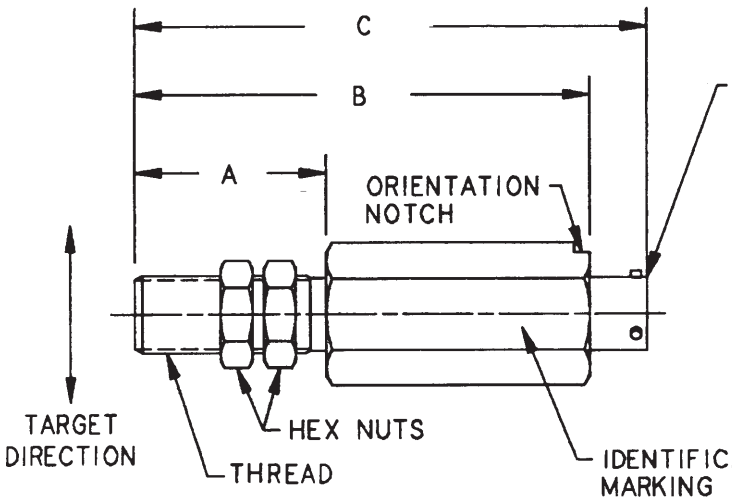
Supply Tracking Fig. 2



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

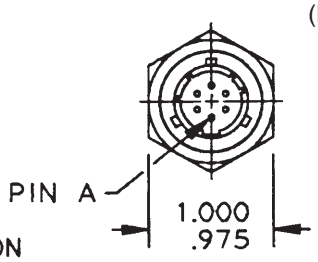
Bi-Directional, Dual Channel, Hall Effect Speed Sensors - 5/8 and 3/4 Threads

Bi-Directional, Hex Body with 6 Pin Connector



Net Weight: 9 oz. max

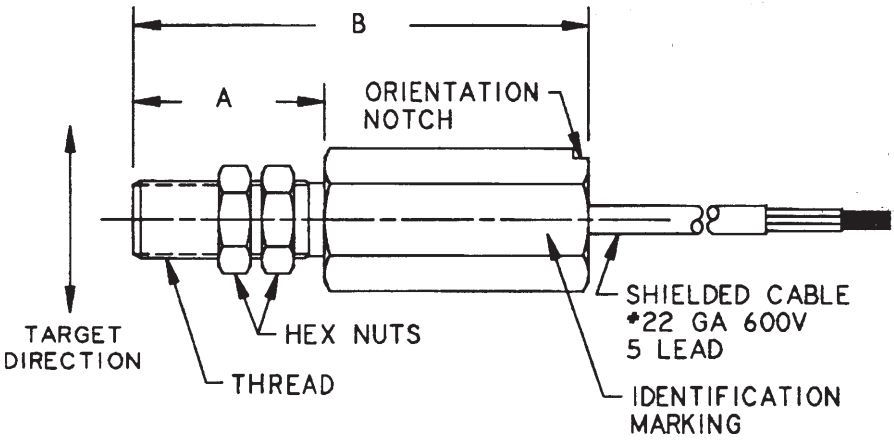
(A) Ch. A out
(B) Not used
(C) Ch. B out
(D) Direct. out
(E) + Supply power
(F) DC Common

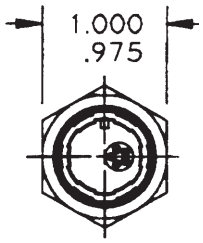


(Select cable from group "C" see index)

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





Red: + Supply power
Blk: DC Common
Wht: Ch. A Out
Org: Ch. B Out
Grn: Direct. Out

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)		TTL Compatible
BH1622-013					Supply Tracking
BH1612-014		2.750 (69.9)	4.625 (117.5)		TTL Compatible
BH1622-014					Supply Tracking

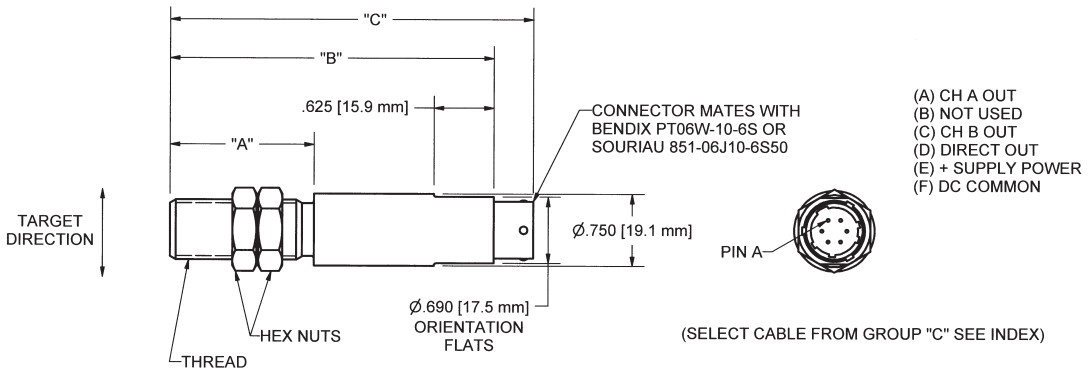
Net Weight: 16 oz. max

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

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

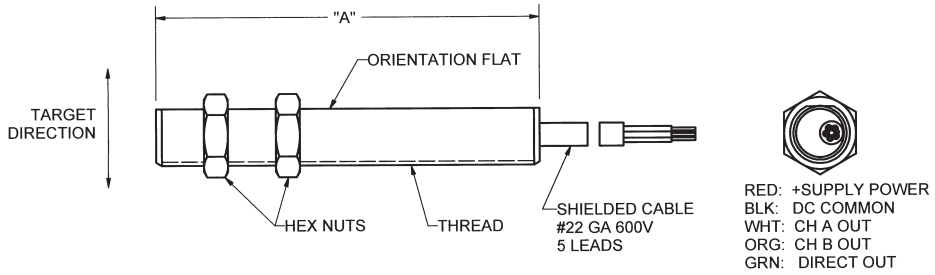
Bi-Directional, Round Body with Connector



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).

AI-Tek Instruments, Cheshire, CT USA

Connectors and Cable Assemblies

AI-Tek stocks a selection of connectors and cable assemblies for your convenience. For ease of selection, the connectors and assemblies are divided into groups. Group “A” is designed for 2-wire items, Group “B” for 3-wire and Group “C” for 5-wire.

Complete cable assemblies include the connector and 10' of recommended wiring for use with AI-Tek equipment. All wiring is insulated, and wrapped with braided or copper shield and jacketed in long-lasting PVC, Teflon or polyolefin insulation. Alternate cable length is 50', use -050 for final suffix.



Group		A-I Tek P/N	Mil. Connect. No.	Max. Temp.	Cable Wiring
A	S	CN79860 -3100	MS3106A10SL-4S	125°C	Connector Only
	R	-3800	MS3108B10SL-4S	125°C	Connector Only
	S	-3000	MS3456L10SL-4S	175°C	Connector Only
	S	CA79860 -01-010	MS3106A10SL-4S	105°C	2 #22 Black & White
	R	-17-010	MS3108B10SL-4S	105°C	2 #22 Black & White
	S	-06-010	MS3456L10SL-4S	175°C	2 #20 Black & White
B	S	CN79860 -2600	MS3106A10SL-3S	125°C	Connector Only
	R	-3900	MS3108B10SL-3S	125°C	Connector Only
	S	CA79860 -18-010	MS3106A10SL-3S	125°C	3 #20 Red,White & Black
	R	-24-010	MS3108B10SL-3S	125°C	3 #20 Red,White & Black
C	S	CN79860 -4200	MIL-C-26482	125°C	Connector Only
	S	CA79860-30-010	PT06W-10-6S Bayonet Style	125°C	5#22 Red, Orange, Black, White, Green

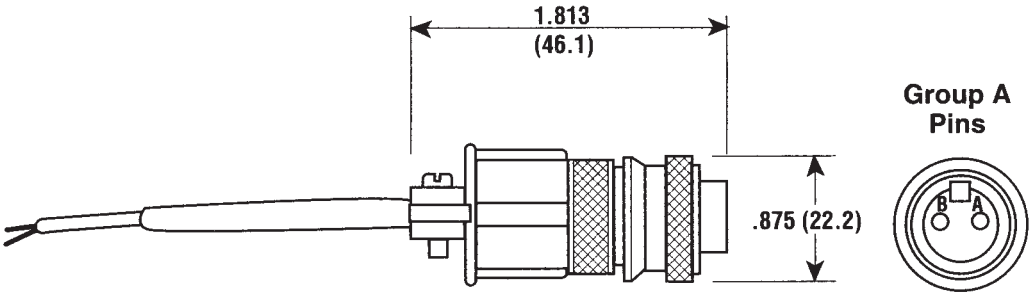
Net Weight: 5 oz. max.

Standard cable assemblies include 10ft. of shielded cable. Special length cables may be available for 50 pcs or more.

S = Straight Connector
R = Right Angle Connector

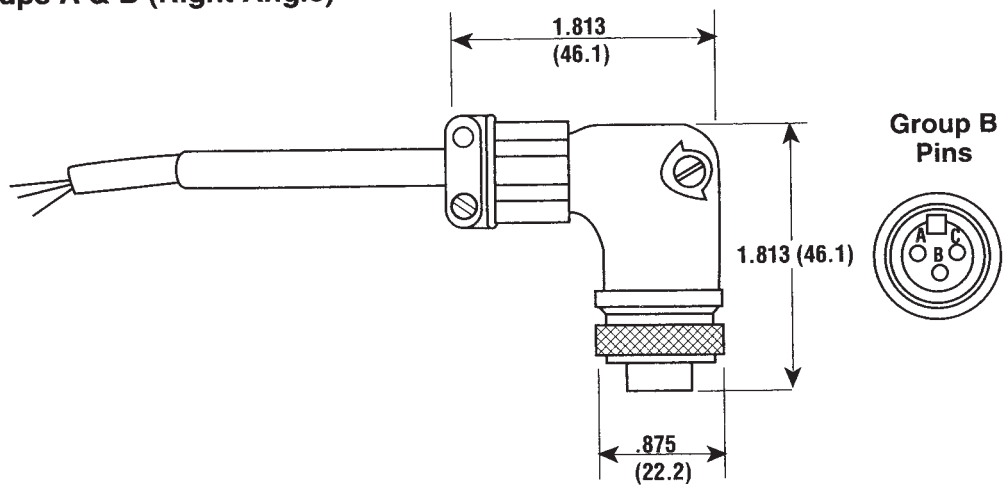
It is the customer's responsibility to determine whether the product is proper for customer's use and application.

Groups A & B (Straight)



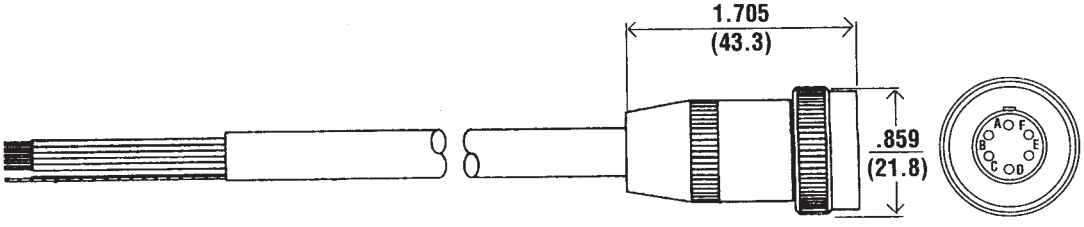
Group A
PIN A = Black
PIN B = White

Groups A & B (Right Angle)



Group B
PIN A = Red
PIN B = White
PIN C = Black

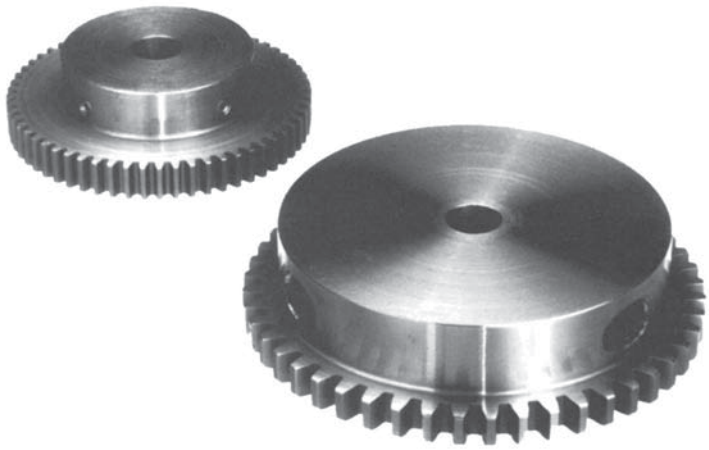
Group C



Group C
PIN A = White
PIN B = Not Used
PIN C = Orange
PIN D = Green
PIN E = Red
PIN F = Black

Split Gears

When using an AI-Tek speed sensor in RPM measurement, split gears provide a convenient and simple means of installation where shaft disassembly is not feasible. The two halves of the gear are fastened with clamping screws, thus assuring close fit. All split gears are 12 diametral pitch, 14.5° pressure angle.



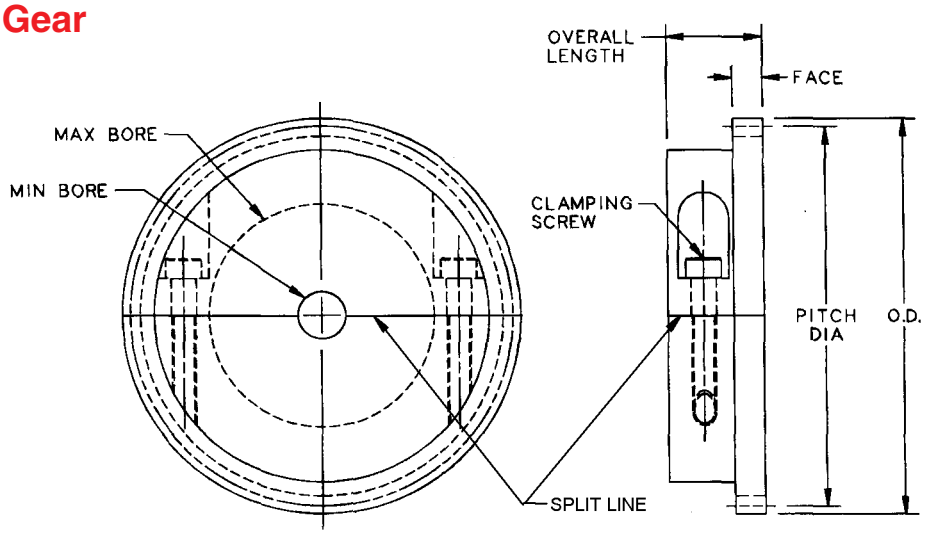
Solid Gear

AI-Tek also offers a 20 diametral pitch, 14.5° pressure angle, solid steel gear. This gear can be rebored to fit shaft diameters up to 1.375". It is secured to the shaft with 2 set screws.

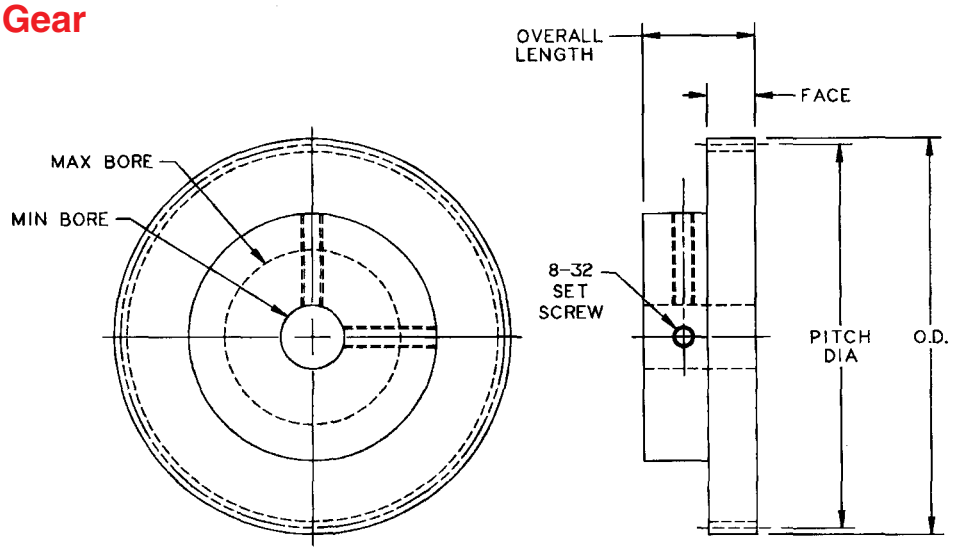
Note: **Gears are supplied with minimum bores as shown. Alternate bores within the minimum and maximum limits are available at additional cost.**
Caution**: Gears may shatter if not installed to specifications or if operated above maximum RPM.**

Dimensions of Steel Split Gears									
Part No.	Pitch Dia., In.	O.D. Inches	No. of Teeth	Tooth Face, In.	Overall Length, In.	Std. Bore Dia., In.	Max. Bore Dia., In.	Approx. Wt., Lbs.	Max. RPM
G79870-202-1800	4.000	4.166	48	.312	1.000	0.500	2.125	3.0	8400
G79870-202-1901	5.000	5.166	60	.312	1.000	1.000	3.125	5.0	5900
G79870-202-2001	6.000	6.166	72	.312	1.000	1.000	4.000	7.0	5900
G79870-202-2101	8.000	8.166	96	.312	1.125	1.000	5.750	15.0	4500
G79870-202-2201	10.000	10.166	120	.312	1.250	1.000	7.500	26.0	3000
G79870-202-4233	15.000	15.166	180	.375	1.375	7.500	12.000	48.0	2400
Dimensions of Solid Steel Gear									
G79870-202-0967	3.000	3.100	60	.375	0.875	0.375	1.375	1.2	6000

Steel Split Gear



Solid Steel Gear



Al-Tek Instruments, Cheshire, CT USA



Tachometer Transducers

AI-Tek tachometer transducers are self-generating units when used with speed sensors. They are designed primarily to provide an easy means of attaching a pulse generating assembly to rotating shafts. Sensor gapping, shaft run-out and mounting problems are eliminated. This makes the unit especially useful for shafts with high run-out. The ordering map on the following page provides information for selecting a unit for your particular application. Please note that sensors and cable assemblies must be ordered separately.

Taper-Lock® Type

The assembly consists of a Taper-Lock bushing which enables quick attachment to rotating shafts. The transducer employs a rotor with small perforations along its periphery; a permanently lubricated sealed bearing; an outer ring and a reference rod which, when clamped in position, prevents the outer ring assembly from moving. The outer ring can accomodate up to three speed sensors for use in monitoring directions of rotation and speed.

Sleeve Type

The **AI-Tek** sleeve-type transducer assembly is identical to the Taper-Lock type except that it provides a sleeve bushing with two set screws for installation purposes, allowing larger shaft sizes.

Mechanical Specifications

Lubrication: Bearings are permanently lubricated; do not use pressure washes or solvents.
Finish: Reference rod and outer ring are anodized aluminum.
Reference Rod : 1/4" diameter, 6" long
Bearing Limits: 4000 RPM max. speed
Weight: 54 oz. (1.53 kg) max.
Sensor Mounting: 5/8-18 UNF-2A threaded hole std.

Electrical Specifications

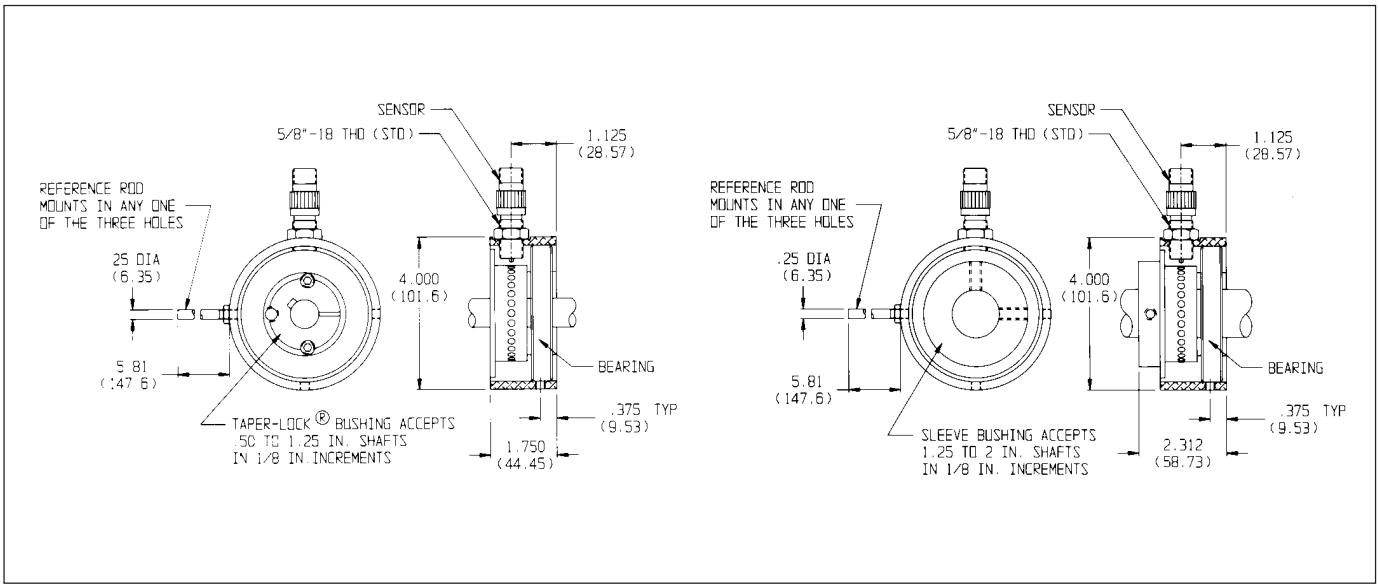
Output Frequency: 30 pulses/rev. (1 Hz = 2RPM), Standard; 60 pulses/rev. (1 Hz - 1RPM), Optional.
Output Voltage: Depends on magnetic sensor used. One turn of sensor controls 0.056 inches of air gap based on 5/8-18 UNF-2A thread. Normal gap setting range from 0.005 to 0.020 inches.
Ambient Temperature: -30°C to +50°C

NOTE: *Not for use in abrasive atmospheres.*

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

AI-Tek Instruments, Cheshire, CT USA

Ease of Installation



Ordering Map

T79850-103- ☐ ☐ ☐ ☐

Basic Model
1. Tachometer Transducer to accommodate one sensor, 30 pulses/rev. (standard)
2. Tachometer Transducer to accommodate two sensors, 30 pulses/rev.
4. Tachometer Transducer to accommodate one sensor, 60 pulses/rev.
5. Tachometer Transducer to accommodate two sensors, 60 pulses/rev.

Bearing/Bushing Type

2. Taper-Lock bushing & sealed bearing

or

4. Sleeve bushing & sealed bearing

Bore Size
11 - Bore Diameter 1/2"
12 - Bore Diameter 5/8"
13 - Bore Diameter 3/4"
14 - Bore Diameter 7/8"
15 - Bore Diameter 1"
16 - Bore Diameter 1 1/8"
17 - Bore Diameter 1 1/4"

or

18 - Bore Diameter 1 3/8"
19 - Bore Diameter 1 1/2"
20 - Bore Diameter 1 5/8"
21 - Bore Diameter 1 3/4"
22 - Bore Diameter 1 7/8"
23 - Bore Diameter 2"

Notes:
Standard mounting thread is 5/8-18 UNF-2A.

Ordering Procedure

Example: Speed indicating system for a variable speed motor, 0 - 1750 RPM, 1" shaft diameter, panel-mount display within 10 ft., min. motor speed is 175 RPM.

1. Select Model No. **T79850 - 103 - 1215**
   30 PPR, std. basic model
   Taper-lock, sealed bearing — 1" bore dia.
2. Select a speed sensor such as P/N 70085-1010-001
3. Select a cable assembly, P/N CA79860-01-00, to complement (2).
4. Select tachometer to meet application needs.

Dimensions in inches and (mm).

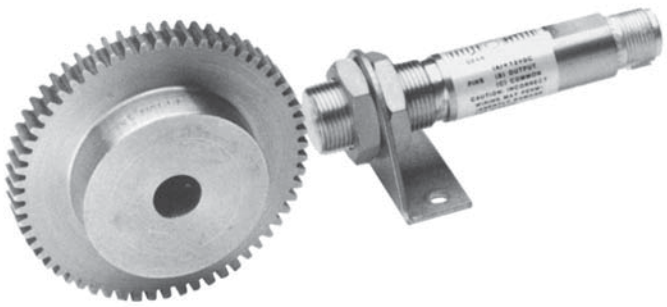
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Sensor Mounting Brackets

Several types of brackets are available to facilitate the mounting of AI-Tek speed sensors. Threaded brackets for 3/8-24, 5/8-18 and 3/4-20 threads are generally used with passive sensors with one locknut. Active, zero- velocity sensors and passive, chisel-point sensors that require specific alignment should be used with unthreaded brackets and two locknuts.

Bracket material is non-magnetic, 303 stainless steel; locknuts are also non-magnetic stainless steel or plated brass.

Sensors and brackets should be attached to a frame free of excessive vibration to prevent spurious indications when the gear is stopped or turning at very slow speeds. Refer to sensor specifications for proper air gap and alignment with gear (target) rotation.



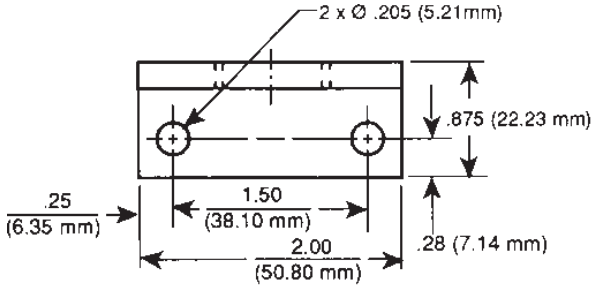
Caution: **Too small an air gap, especially with excessive run-out, may cause the gear to strike the sensor and make it inoperative.**

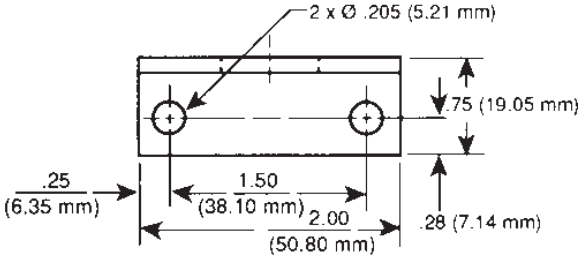
Threaded Brackets		
Thread Size	**Bracket Part No.**	**One Turn Advances**
3/8-24 UNF-2B	646-310-0006	.042"
5/8-18 UNF-2B	646-310-0007	.056"
3/4-20 UNEF-2B	646-310-0008	.050"

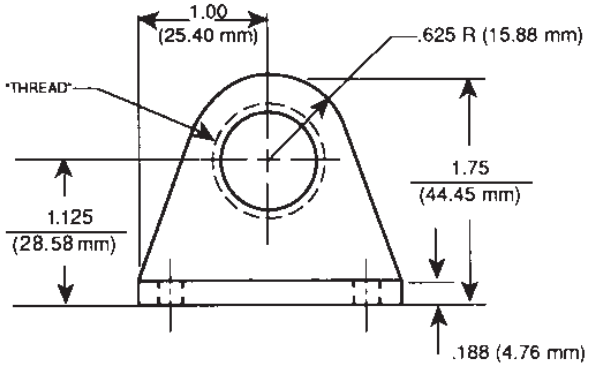
Net Weight: 4 oz. max.

Unthreaded Brackets		
Thread Size Of Sensor	**Hole Diameter**	**Bracket Part No.**
3/8-24 UNF-2A	.390"	646-140-0009
5/8-18 UNF-2A	.640"	646-140-0010
3/4-20 UNEF-2A	.765"	646-140-0015

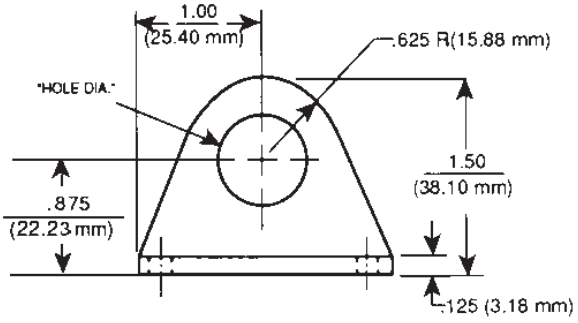
Net Weight: 2 oz. max.







Threaded Bracket



Unthreaded Bracket

Dimensions in inches and (mm).

AI-Tek Instruments, Cheshire, CT USA

PART NUMBER INDEX

Part Number Page

Passive Sensors

70084-1713-111 10

70085-1010-001 7
70085-1010-002 7
70085-1010-003 7
70085-1010-004 8
70085-1010-005 17
70085-1010-007 12
70085-1010-018 7
70085-1010-024 15
70085-1010-026 7
70085-1010-028 8
70085-1010-037 16
70085-1010-041 13
70085-1010-056 12
70085-1010-078 9
70085-1010-081 17
70085-1010-086 12
70085-1010-118 7
70085-1010-131 9
70085-1010-137 9
70085-1010-174 13
70085-1010-175 7
70085-1010-182 16
70085-1010-214 9
70085-1010-220 10
70085-1010-227 15
70085-1010-289 16
70085-1010-299 16
70085-1010-314 14
70085-1010-327 17
70085-1010-328 17
70085-1010-329 17
70085-1010-330 17
70085-1010-355 12
70085-1010-403 18
70085-1010-404 18
70085-1010-405 18
70085-1010-406 18
70085-1010-408 7
70085-1010-411 17

Part Number Page

70085-1010-412 17
70085-1010-413 17
70085-1010-414 17
70085-1010-415 18
70085-1010-416 18
70085-1010-417 18
70085-1010-420 18
70085-1010-421 11
70085-1010-424 11
70085-1010-425 11
70085-1010-428 13
70085-1010-458 13
70085-1010-469 8
70085-1010-472 15

70085-8080-001 14
70085-8080-003 10
70085-8080-004 14
Side Look Sensor 19-20

Hall Effect Sensors

RH1320-XXX 26-27
RH1512-XXX 22-25
RH1522-XXX 22-25
RH1612-XXX 22-25
RH1622-XXX 22-25
Bi-Directional 28-31

Connectors and Cable Assemblies

CA79860-01-XXX 32

Gears

G79870-202-XXXX 34

Transducers

T79850-103-XXXX 36

Brackets

646-XXX-XXXX 38