

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

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

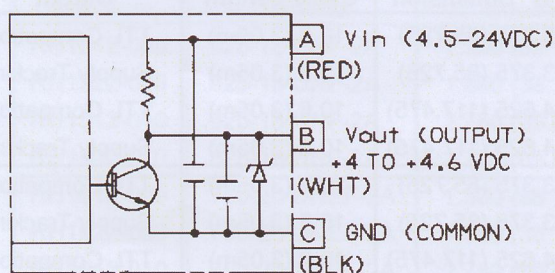


Figure 1

Supply Tracking

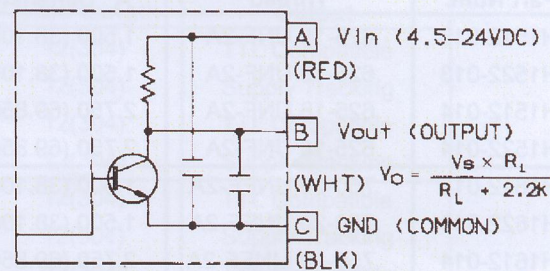
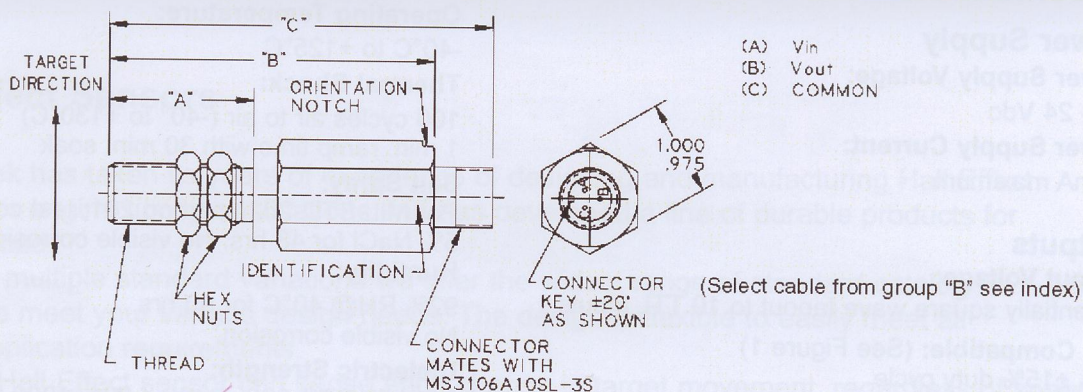


Figure 2

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

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

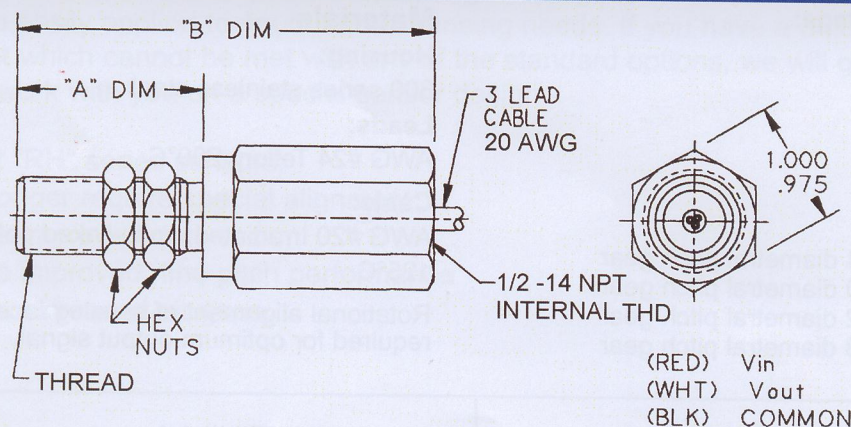
Hex Body with Connector



OBSOLETE SUPERSEDED BY:

Old Part Num.	Superseded By	Remarks
H1512-001	RH1512-005	See Page #42 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

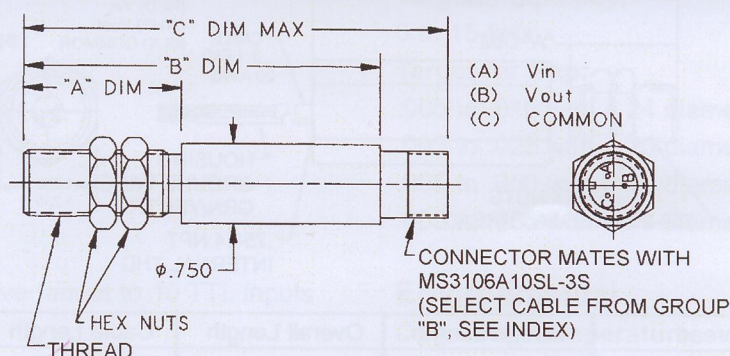


Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-013	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-014	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)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

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

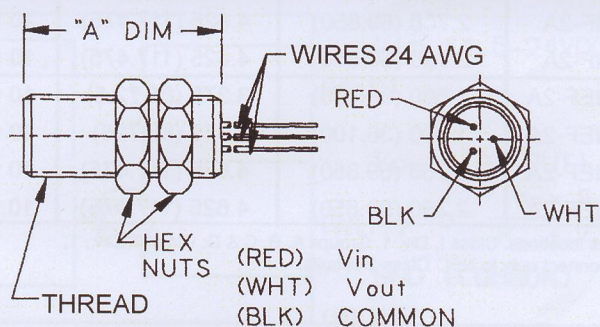
Round Body with Connector



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 (165.405)	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



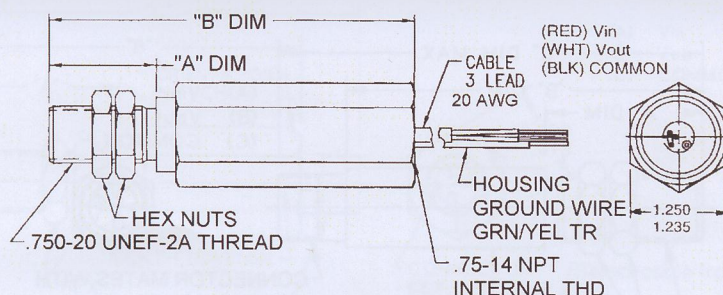
Part Num.	Thread	"A" Dimension	Lead Length	Output
RH1512-009	.625-18 UNF-2A	1.500 (38.100)	12(304)	TTL Compatible
RH1522-009	.625-18 UNF-2A	1.500 (38.100)	12(304)	Supply Tracking
RH1512-010	.625-18 UNF-2A	2.750 (69.850)	12(304)	TTL Compatible
RH1522-010	.625-18 UNF-2A	2.750 (69.850)	12(304)	Supply Tracking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

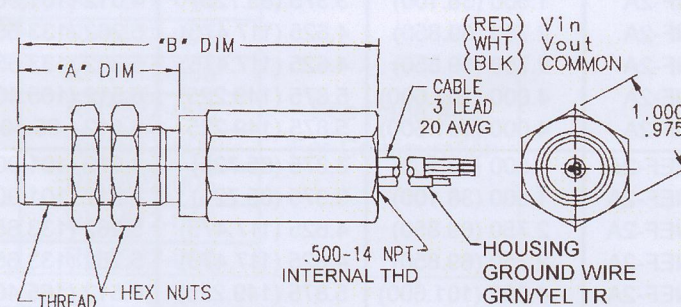
Zero Velocity - Magnetic Hall Effect Sensors - 5/8 and 3/4 Threads

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

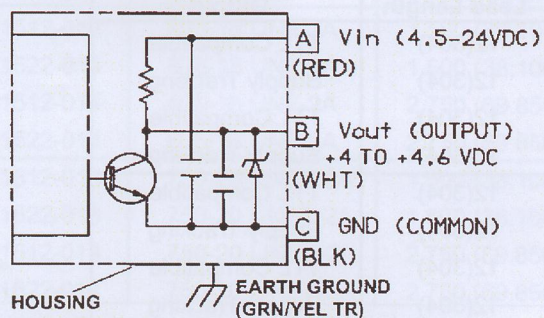
Rating: UL & CSA listed for hazardous locations. Class I, Div. 1, Groups A, B, C & D; Class II, Div. 1, Groups E, F & G. Temp Code T4A. Connect only to NEC Class 2 circuits.
Net Weight: 23 oz. max.



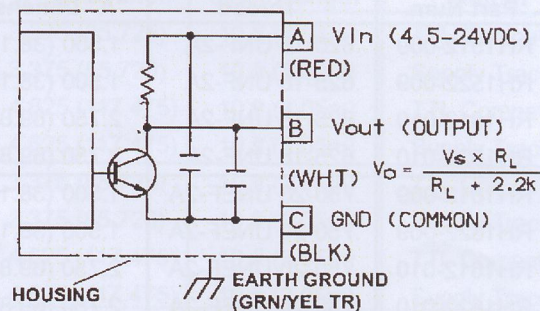
Part Num.	Thread	"A" Dimension	"B" Dimension	Cable Length	Output
RH1512-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	TTL Compatible
RH1522-026	.625-18 UNF-2A	1.500 (38.100)	3.375 (85.725)	10 ft (3.05m)	Supply Tracking
RH1512-027	.625-18 UNF-2A	2.750 (69.850)	4.625 (117.475)	10 ft (3.05m)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



Supply Tracking



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% $\pm$ 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 $\pm$ 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

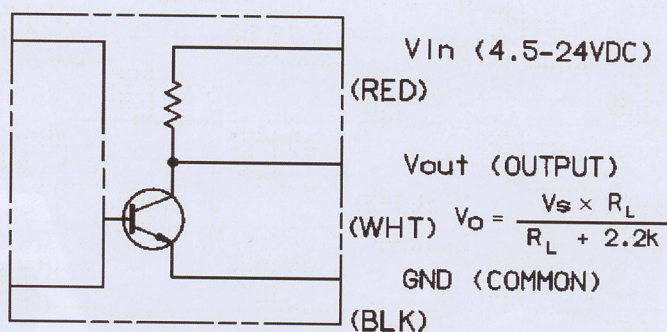
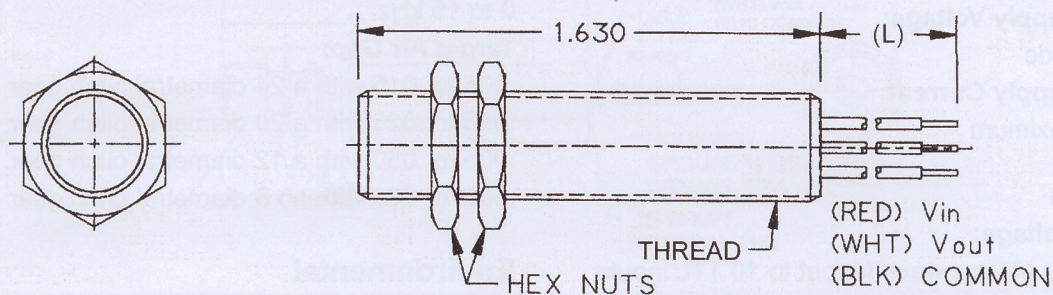


Figure 1

Note: Will work with any AI-Tek Tachometer.

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

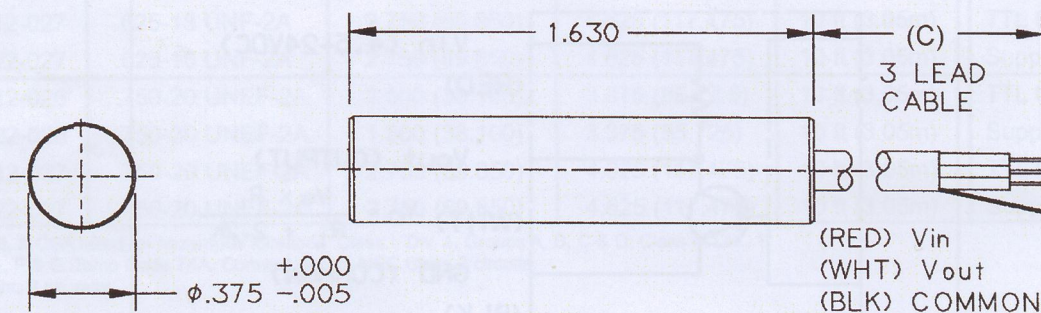
Fully Threaded



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)	—