

### PRODUCT DESCRIPTION

SPECTEC's Intrinsically Safe digital output linear and angular position sensors are designed for installation in hazardous locations. They are offered in a wide variety of configurations as outlined on page 2. Custom sensors can also be created to meet specific needs.

For connector version refer to IS220 Bulletin.

These sensors are designed to sense continuous variations in magnetic field and convert field strength to a proportional voltage. The output voltage produced for zero magnetic field is nominally 2.5V, with a standard transfer function of  $\pm 5\text{mV}/\text{Gauss}$ . Magnetic sensitivity is in one axis only. Several units can be combined to measure (X, Y, Z) magnetic field vectors.

### INSTALLATION

**CAUTION: This sensor MUST be installed with an FM approved barrier and following the details specified in the Installation Instruction Document #85047.**

### SPECIFICATIONS

**Supply Voltage:** 8 to 30 Vdc @  $\leq 8\text{ mA}$

**Output Range:** Voltage  
 $< 0.5\text{V}$  to  $> 4.5\text{V}$   
 (0.06 - 4.95V typical)

Current  
 $-1.0\text{mA}$  (source) Max.  
 $10.0\text{mA}$  (sink) Max.

**Quiescent Output Voltage:**  $2.500\text{V} \pm 0.075\text{V}$  at Zero field equivalent to  $\pm 15\text{ Gauss}$  (Standard) (R Load  $\geq 1\text{M}\Omega$  for stated accuracy and output)

**Output Resistance:**  $300\ \Omega$  typical

**Frequency Range:** DC to  $\sim 30\text{ kHz}$

**Sensitivity:** See Page 2

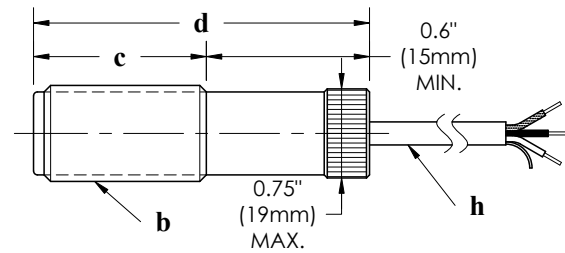
**Sensing Orientation:** No Magnet stabilizes at 2.5V  
 North Pole shifts towards 0V  
 South Pole shifts towards 5V

**Sensing Distance:** 0 to  $> 1.0''$   
 @ 3000 Gauss typical

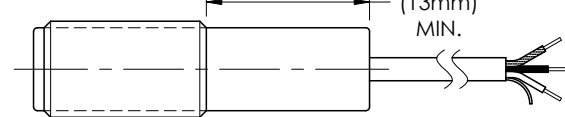
**Connection:** Lead wires/Cable, See page 2

**Construction:** 300 Series Stainless Steel  
 Solid Epoxy Encapsulation

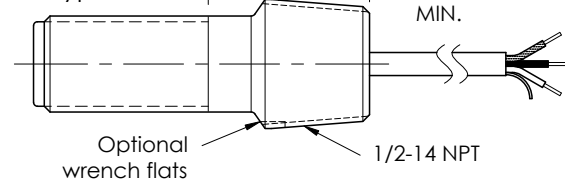
### K shell type



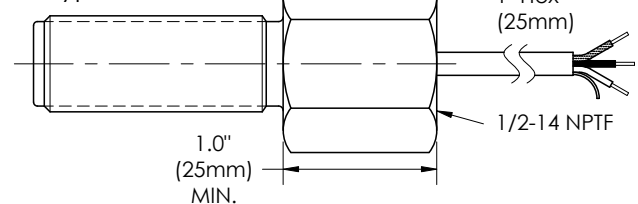
### A shell type



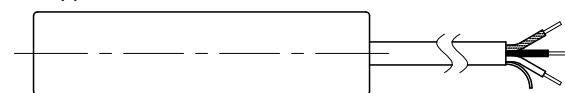
### X shell type



### Y shell type



### S shell type



### CERTIFICATIONS for IS221

USA:

Intrinsically Safe  
 Class I, II, III, Division 1  
 GROUP ABCDEFG T6...T5  
 Class I, Zone 0, AEx ia IIC T6...T5



Canada:

Intrinsically Safe  
 Class I, Division 1, GROUP ABCD T6...T5  
 Class I, Zone 0, Ex ia IIC T6...T5  
 T5 @  $-40^\circ\text{C} \leq T_{\text{amb}} \leq +85^\circ\text{C}$   
 T6 @  $-40^\circ\text{C} \leq T_{\text{amb}} \leq +65^\circ\text{C}$

### CERTIFICATIONS for IS221A

ATEX & UKEX:



CE:



IECEx:



II 1 G Ex ia IIC T6...T4 Ga  
 FM08ATEX0066X & FM22UKEX0108X

Compliance with  
 EN55011, EN50082-2

Ex ia IIC T6...T4 Ga  
 IECEx FMG 16.0003X

T4 @  $-40^\circ\text{C} \leq T_{\text{amb}} \leq +100^\circ\text{C}$   
 T5 @  $-40^\circ\text{C} \leq T_{\text{amb}} \leq +85^\circ\text{C}$   
 T6 @  $-40^\circ\text{C} \leq T_{\text{amb}} \leq +65^\circ\text{C}$



# FEATURE SELECTION for IS221-xx

SPECTEC P/N	a Shell Type	b Thread / Diameter	c Thread Length	d Overall Length	h Lead Wires	k Sensitivity
IS221-xx or IS221A-xx	<b>K</b> <b>A</b> <b>H</b>	1/2-20 UNF 5/8-18 UNF 11/16-24 UNEF 3/4-16 UNF 3/4-20 UNEF M16x1.5 M18x1.5	0.75" (19mm) Minimum 13.0" (330mm) Maximum	1.25" (32mm) Minimum 14.0" (356mm) Maximum	Shielded Cable  18 to 24 AWG (depending on shell size)  PVC or TFE insulation  Red - Supply Black - Common White - Output Shield - Floating (Not connected to shell)  12" (.3m) 36" (1m) 120" (3m)  NOTE: Other lead wire lengths are available.	Standard: 5 mV/Gauss  Medium: 3.125 mV/Gauss  High: 2.5 mV/Gauss
	<b>X</b>	5/8-18 UNF 11/16-24 UNEF 3/4-16 UNF 3/4-20 UNEF	0.70" (18mm) Minimum 13.0" (330mm) Maximum	1.88" (48mm) Minimum 14.0" (356mm) Maximum		
	<b>Y</b>	5/8-18 UNF 3/4-20 UNEF	1.1" (28mm) Minimum 13.0" (330mm) Maximum	2.35" (60mm) Minimum 14.0" (356mm) Maximum		
	<b>S</b>	5/8" (15.9mm)	N/A	1.25" (32mm) Minimum 14.0" (356mm) Maximum		

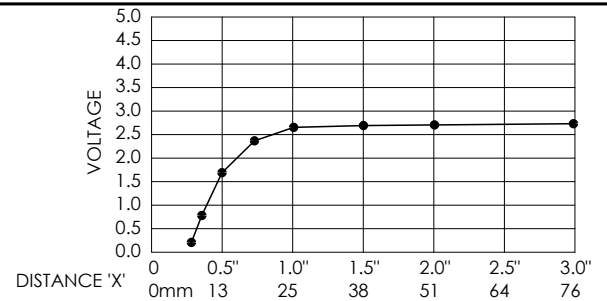
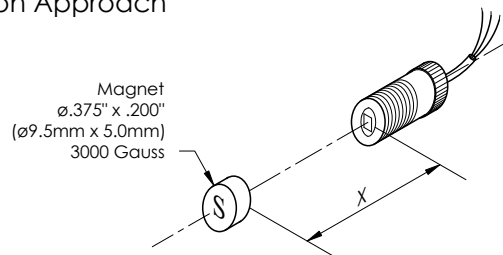
The above features give the range of products available under the certifications.  
Please specify your specific needs when contacting sales.

**SPECIFIC MODELS:** (also available with ATEX, UKEX, & IECEx certification under the part number IS221A-xx)

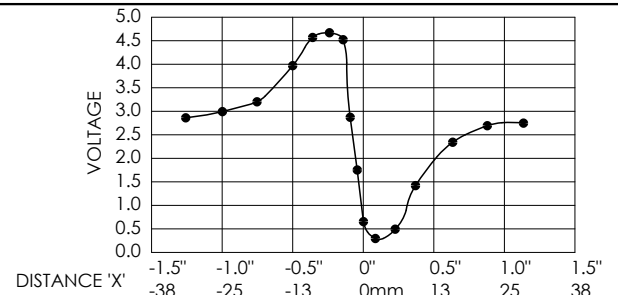
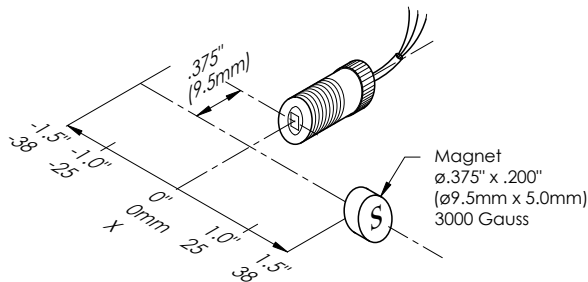
<b>IS221-01</b>	<b>K</b>	5/8-18 UNF	1.8" (45mm)	2.5" (64mm)	36" (1m) PVC	5 mV/Gauss
<b>IS221-03</b>	<b>A</b>	M18x1.5	2.0" (51mm)	2.5" (64mm)	10' (3m) PVC	

## TYPICAL PERFORMANCE DATA

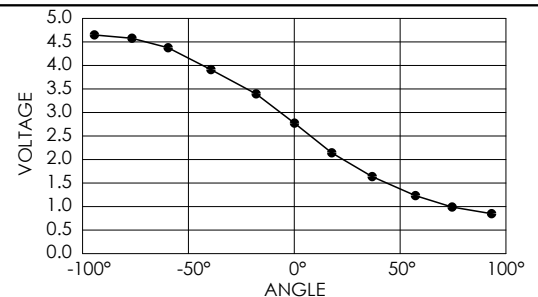
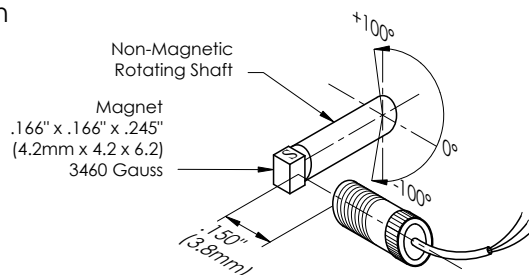
### Head-on Approach



### Fly By



### Shaft Rotation



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