

# Bulk Indium Arsenide BH-700 Series **Hall Sensors**

## Single Axis

### Description

Designed to meet the requirements of a wide range of magnetic field measurement applications, the BH-700 Series are small, solid-state devices that provide an output voltage proportional to the product of control current and ambient flux density. Five single-axis models are available to measure axial and transverse magnetic field components with sensitivities from 7.5 to 50mV/kG and input and output resistance of several ohms.



### Electrical Specifications

- BH-702**
- Air gap: between concentrator and substrate, 0.0025" nominal and 0.003" maximum.
  - Sensitivity: Basic sensitivity of Hall element .15 V/A-kG min. With the unit suspended in a free field of 100 oersteds and  $I_c=200$  mA, the open circuit Hall voltage is 8.0 mV min. In a closed magnetic circuit with  $I_c=200$  mA,  $V_H$  is 3.2mV/Ampere turn min.
  - Polarity: With the magnetic field vector as shown and  $I_c$  entering the red lead, the positive Hall voltage will appear at the blue lead.
- BH-701**
- Linearity:  $V_H$  vs. B, -10 to +10 kG:  $\pm 0.25\%$  of reading, max.
- BH-704**
- Linearity:  $V_H$  vs. B, -30 to +30 kG:  $\pm 1.0\%$  of reading, max.  
 $V_H$  vs.  $I_c$ , 0 to 100 mA:  $\pm 0.1\%$  of reading, max.  
 $V_H$  vs.  $I_c$ , 0 to 300 mA:  $\pm 1.0\%$  of reading, max.
  - Encapsulation: The BH-701 and the BH-704 are encapsulated in a rugged aluminum oxide ceramic and epoxy case for excellent heat transfer and strength.

\*approximate

### Mechanical Specifications

- Color Code: Control Current ( $I_c$ ): Red (+ $I_c$ ) Black (- $I_c$ )  
 Hall Voltage ( $V_H$ ): Blue (+ $V_H$ ) Yellow (- $V_H$ )
- Polarity: With the magnetic field vector (+B) entering the top of the Hall plate and  $I_c$  entering the red lead, the positive Hall voltage will appear at the blue lead.

### Models

- BH-700 Low cost, Transverse, General Purpose  
 BH-701 Rugged, High-Linearity, Transverse, Instrumentation Quality  
 BH-702 Low Field (ferrite-embedded), Transverse  
 BH-704 Rugged, High Linearity, Axial, Instrumentation Quality  
 BH-705 General Purpose, Transverse

SPECIFICATIONS	UNITS	BH-700	BH-701	BH-702	BH-704	BH-705
Input resistance, $R_{in}$	ohms	5.5 max.	2 max.	3.5 max.	2.5 max.	2.2 max.
Output resistance, $R_{out}$	ohms	5.5 max.	2 max.	3.5 max.	2.5 max.	2 max.
Open circuit magnetic sensitivity, $V_{HOC}$ (1)	mV/kG	50 min.	7.5 $\pm$ 20% (3)	***	7.5 $\pm$ 20%	10 $\pm$ 25%
Max. resistive residual voltage, $V_M$ @ B=0 (1)	$\pm\mu$ V	1500 max.	75 max.	250 max.	75 max.	300 max.
Max. control current @25°C, static air	mA	250	300	300	300	250
Nominal control current	mA	200	100	200	100	100
Max. linearity error, (0 to 10 kG) with $R_{in}$	$\pm\%$ of RDG	3	-	-	-	1
Zero field thermal voltage	$\mu$ V	-	5 max.	-	5 max.	5 max.
Mean temperature coefficient of $V_H$ (-20°C to +80°C) (2)*	%/°C	-0.2	-0.04	-0.18	-0.04	-0.08
Mean temperature coefficient of resistance (-20°C to +80°C) (2)*	%/°C	+0.2	+0.18	+0.18	+0.18	+0.2
Temperature dependence of resistive residual voltage (-20°C to +80°C) (2)*	$\pm\mu$ V/°C	6 typical	0.3 typical	2.5 typical	0.5 max.	1 max.
Operating temperature range	°C	-40°C to +100°C	-40°C to +100°C	-55°C to +100°C	-40°C to +100°C	-65°C to +100°C
Storage temperature range	°C	-40°C to +105°C	-40°C to +105°C	-55°C to +105°C	-40°C to +105°C	-65°C to +105°C

### Notes

- $I_c = I_{CN}$
- $I_c = 100$  mA
- Loaded Sensitivity

Rev. date 03/2006

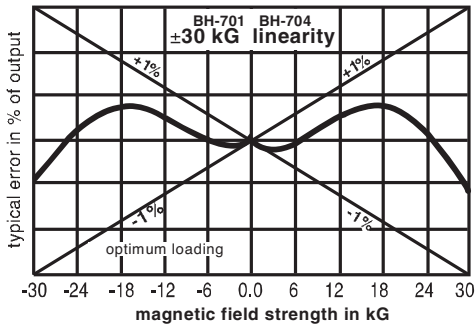


**SYPRIS**  
TEST & MEASUREMENT

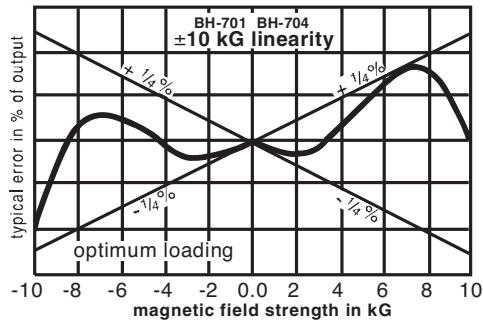
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## Mechanical Dimensions

All dimensions are in inches (millimeters)

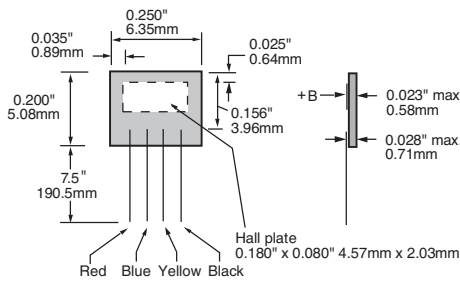


**Note:** Optimum loading range for ±30kG operation is 90-200Ω

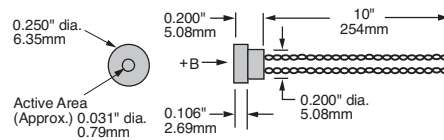


**Note:** Optimum loading range for ±10kG operation is 20-50Ω

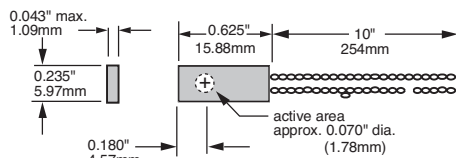
**Model BH-700 Low Cost Transverse**



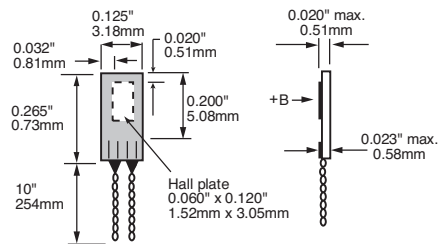
**Model BH-704 High Linearity Axial**



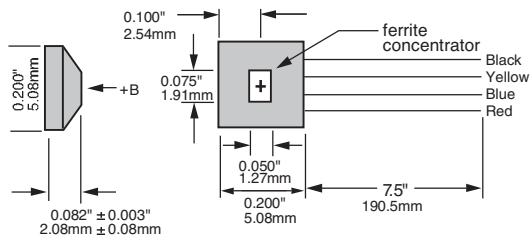
**Model BH-701 High Linearity Transverse**



**Model BH-705 General Purpose Transverse**



**Model BH-702 Ferrite Imbedded Transverse**



**Notes**

All tolerances unless specified are ±.010"



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