

**Rugged inclinometer sensor  
providing Analog Voltage 0-5V  
or Digital Serial (RS232)  
output, two levels of  
temperature compensation,  
& three angle ranges.**



### Description

The H4 Series of inclinometers provide single axis inclination sensing in a rugged environmentally protected metal housing. The sensing package incorporates a liquid capacitive sensing element and integrated temperature compensation over the industrial operating range of  $-40^{\circ}$  to  $+85^{\circ}\text{C}$ .

These sensors are available with a choice of two output configurations, analog voltage or digital serial outputs. These outputs are linear with respect to the input angle directly. Depending on the required accuracy, two levels of temperature compensation are available.

### Digital Serial (RS232) Output

The Serial output (RS232) transmits the degree of angle in a decimal format. This output provides a continuous stream of readings - one reading per line at approximately 250msec per reading. The H4 transmits the output to a computer through its serial port, using HyperTerminal as the interface. The unit is configured for 9600 baud, 8 data bits, no parity, 1 stop bit.

### Features

- Single Axis Angle Measurement
- 3 Ranges:  $\pm 30^{\circ}$ ,  $\pm 45^{\circ}$ ,  $\pm 70^{\circ}$
- 2 Levels of Temperature Compensation
- Analog Voltage 0-5V Output
- Serial Digital RS232 Output
- Vibration and shock resistant
- Environmentally sealed to IP66
- Rugged die-cast Zinc housing
- EMC protected
- Mechanical Zero adjustment
- Common footprint for easy field install

### Applications

- Platform Leveling
- Vehicle Tilt Monitoring
- Antenna Positioning
- Boom Angle Indicating
- Process Machinery

### Technical Specifications

INPUT PARAMETERS	
MEASURING RANGES	$\pm 30^\circ$ , $\pm 45^\circ$ , $\pm 70^\circ$
MEASUREMENT AXIS	Single
POWER SUPPLY	8 to 30 VDC Non-Regulated
	optional 5VDC Regulated
OUTPUT PARAMETERS	
NON-LINEARITY <sup>1</sup>	< 0.5% Full Range for $\pm 30^\circ$ model
	< 0.2% Full Range for $\pm 45^\circ$ , $\pm 70^\circ$ models
NULL REPEATABILITY	< 0.05°
TRANSVERSE SENSITIVITY	< 1.0% at 30° Tilt
SENSOR ELEMENT RESPONSE TIME	< 0.3 seconds (<300mSec)
BANDWIDTH	3 Hz
OPTIONAL TEMPERATURE COMPENSATION OUTPUT DRIFT	< $\pm 1.0^\circ$ (over full operating temperature range)
TEMPERATURE RANGE	
OPERATING TEMPERATURE	-40°F to +185°F (-40°C to +85°C)
STORAGE TEMPERATURE	-49°F to +194°F (-45°C to +90°C)

ANALOG (0...5V) OUTPUT		Temperature Compensation Levels	
		Level 1	Level 2
ZERO OFFSET		2.5VDC typical	2.5VDC typical
ANALOG VOLTAGE OUTPUT (Linear Range)		0.5...4.5VDC	0.5...4.5VDC
OUTPUT VOLTAGE SENSITIVITY			
$\pm 30^\circ$		66.7mV/°	66.7mV/°
$\pm 45^\circ$		44.4mV/°	44.4mV/°
$\pm 70^\circ$		28.6mV/°	28.6mV/°
TEMPERATURE COMPENSATION		Over full operating temperature range	
$\pm 30^\circ$		< $\pm 0.5^\circ$	< $\pm 2.0^\circ$
$\pm 45^\circ$		< $\pm 0.5^\circ$	< $\pm 2.5^\circ$
$\pm 70^\circ$		< $\pm 1.0^\circ$	< $\pm 3.0^\circ$
RESOLUTION			
$\pm 30^\circ$		< 0.02°	< 0.01°
$\pm 45^\circ$		< 0.03°	< 0.01°
$\pm 70^\circ$		< 0.04°	< 0.01°
CURRENT CONSUMPTION		10mA typical	2mA typical
OUTPUT IMPEDANCE		< 100 OHMS	
DIGITAL (RS232) OUTPUT		Temperature Compensation Levels	
		Level 1	Level 2
TEMPERATURE COMPENSATION		Over full operating temperature range	
$\pm 30^\circ$		< $\pm 0.5^\circ$	< $\pm 2.0^\circ$
$\pm 45^\circ$		< $\pm 0.5^\circ$	< $\pm 2.5^\circ$
$\pm 70^\circ$		< $\pm 1.0^\circ$	< $\pm 3.0^\circ$
CURRENT CONSUMPTION		10mA typical	
RS232 OUTPUT FORMAT		ASCII Decimal	
BAUD RATE		9600	
DATA BITS		8	
PARITY		None	
STOP BITS		1	
TRANSMISSION RATE		Continuously updated every 25mSEC	

34 MOUNT PLEASANT ROAD • ASTON • PA • 19014 • USA

610-500-2000

fax: 610-500-2002

info@riekerinc.com

www.riekerinc.com



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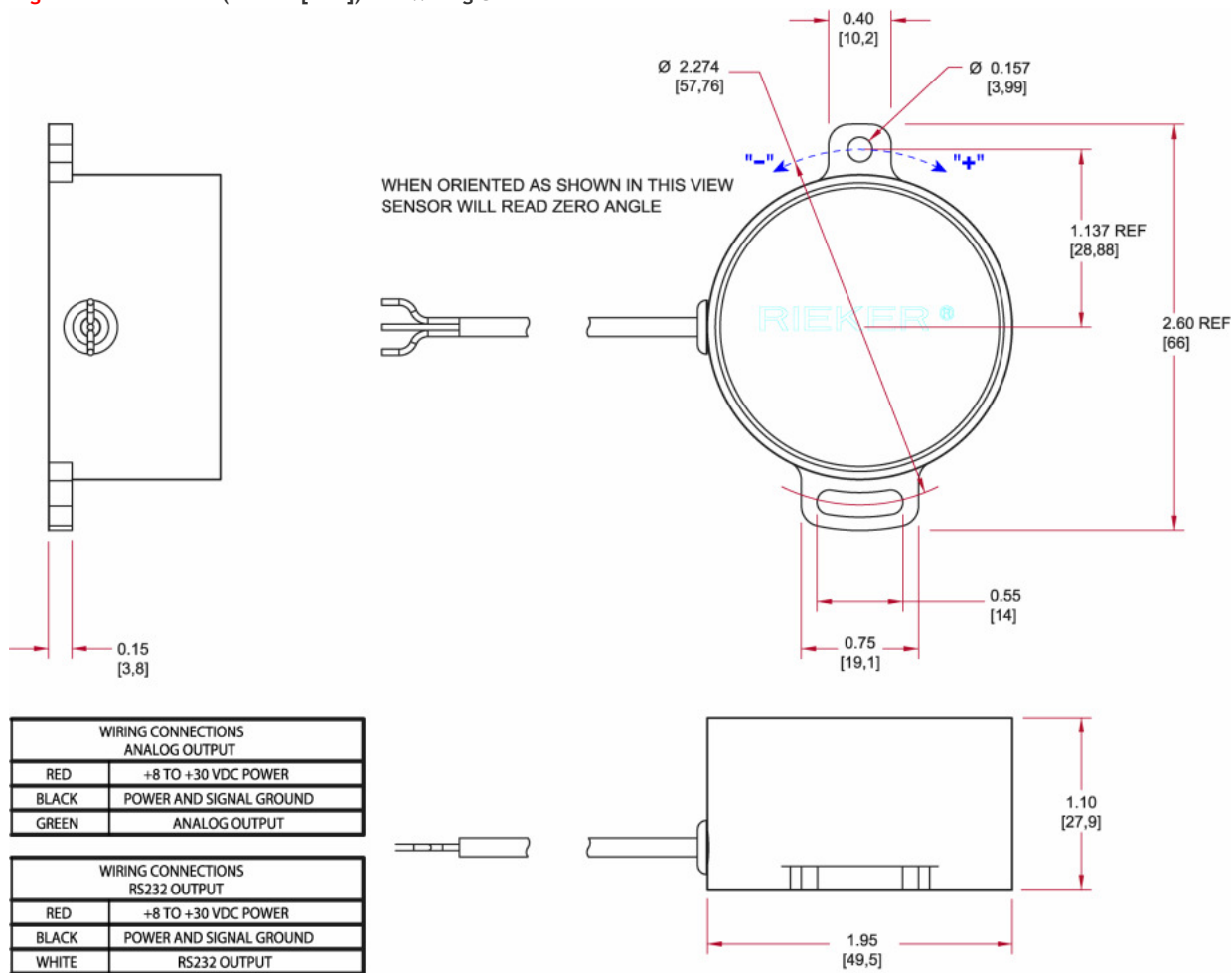
# H4 Series

## General Information Brochure

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MECHANICAL CHARACTERISTICS	
HOUSING	Die Cast Zinc
MOUNTING HOLES	Two #6-32
MOUNTING PLANE	Vertical Surface
OUTLINE DIMENSIONS	Ø1.95" x 1.1" (Ø49.5 x 28mm) See Drawing
ELECTRICAL CONNECTION	1ft. Teflon Cable with 3 pigtail leads
WEIGHT	8 ounces (227 grams)
<b>Notes:</b> 1. Non-linearity generated by best fit straight line using least squares regression. Output is linear with respect to the input angle directly.	

**Figure 1:** Dimensions (inches [mm]) and Wiring Connections



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**TABLE 1:** Part Number for Ordering Information

H4 INCLINOMETER PRODUCT MATRIX CHART									
	H	4	A	1	-	30		-	
	OPTION CODE								
HOUSING									
MACHINED ZINC METAL (Default)	4								
ALTERNATIVE HOUSING	N/A								
OUTPUT									
ANALOG	A								
DIGITAL SERIAL (RS232)	S								
TEMPERATURE COMPENSATION									
LEVEL 1	1								
LEVEL 2	2								
ANGLE RANGES									
"XX" = ±30°, ±45°, ±70°	"XX"								
SPECIAL SCALING	N/A								
INPUT POWER									
8 TO 30VDC (Default)	BLANK								
5VDC	V								
MODEL NUMBER									
STANDARD (or stock) CONFIGURATION (Default)	BLANK								
CUSTOM SPECIAL: "-X" = LETTER ASSIGNED AT TIME OF ORDER	"-X"								

As shown above the part number H4A1-30 represents a standard (or stock) configuration single axis unit with a  $\pm 30^\circ$  measuring range, Analog output, Level 1 Temperature Compensation, 8 to 30VDC supply power.