

## Accurate, User-Configurable, All-in-One Inclinometer

### DESCRIPTION

The H6 inclinometer provides highly accurate, dual axis inclination sensing in a rugged environmentally protected housing. This unit incorporates MEMS sensing elements referenced to gravity with integrated temperature compensation over the entire industrial operating range of  $-40^{\circ}$  to  $+85^{\circ}\text{C}$ .

The H6 provides two continuous and fully configurable analog outputs. These outputs can be individually set to current, voltage or open collector switch modes. The voltage output can be set to any value between 0V and 10V, the current output can be set to any value between 0mA and 24mA - either to any angle range between  $\pm 180^{\circ}$ . The current and voltage outputs are linear with respect to the input angle directly.

The open collector switch output connects to signal common and can be set to trip above, below, between, or outside any angle threshold or window range. The transistor output can be used directly or to drive an external relay (up to 250mA drive capability)

The H6 also includes a polled, half-duplex (2-wire), RS-485 digital interface for angle measurements and configuration. Also available upon request, the H6 has CAN bus hardware available for customer specified protocols (including J1939 and CanOPEN).

All analog output parameters can be configured via the RS-485 interface at the factory to meet your specifications or through the Flex Series Development Kit and software allowing the end customer to modify the sensor as needed right from a PC - providing full flexibility for R&D and OEM production lines.

Used as integrated devices by original equipment manufacturers (OEMs) or as standalone sensors for test and measurement, the H6 is made for applications where high accuracy and long-term stability are required in noisy and wide temperature changing environments. For use with most applications including commercial, industrial, and military applications.



### FEATURES

- Dual Axis
- Horizontal and Vertical Mount
- Scalable Angle Range up to  $\pm 180^{\circ}$
- Fully Temperature Compensated
- Multiple, Simultaneous, Configurable Outputs
  - Current
  - Voltage
  - Open Collector Switch
  - RS-485
  - CAN bus
  - Optional Logging to SD Card
- Daisy-chain Multiple Sensors
- Vibration and shock resistant
- Environmentally sealed IP68
- Rugged Aluminum housing
  - Optional Stainless Steel 316
- EMC protected to 100V/m
- Reverse Polarity Protection
- Overvoltage/overcurrent protection
- $-40^{\circ}$  to  $+85^{\circ}\text{C}$  Operating Temperature
- CE Certified

### INDUSTRIES

- Aerospace & Defense
- Construction
- Mining
- Offshore
- Transportation

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

610-500-2000

fax: 610-500-2002

[inquiry@riekerinc.com](mailto:inquiry@riekerinc.com)

[www.riekerinc.com](http://www.riekerinc.com)



# Flex Series - H6

## General Information Brochure

**TABLE 1: H6 SENSOR SPECIFICATIONS**

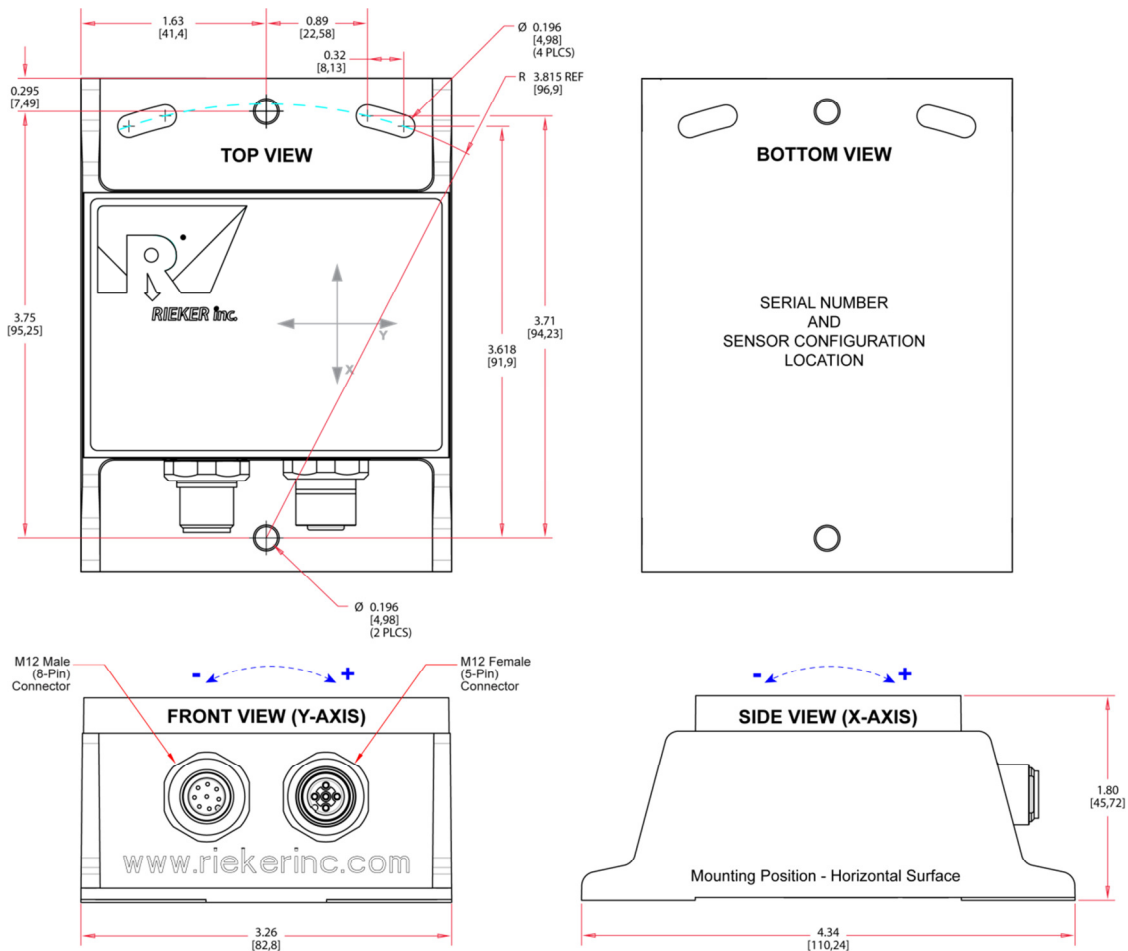
INPUT PARAMETERS			
<b>SUPPLY VOLTAGE</b>	+11..36 VDC Non-Regulated		
<b>SUPPLY CURRENT<sup>1</sup></b>	22mA @ 24VDC (Digital Output only)		
	30mA nominal @ 24VDC (Analog Output - no load)		
	75mA max @ 24VDC (Analog and Digital Outputs enabled)		
	85mA max @ 12VDC (Analog and Digital Outputs enabled)		
<b>ANALOG MEASURING RANGE</b>	Scalable within 360°		
<b>DIGITAL MEASURING RANGE</b>	±180°		
<b>INPUT PROTECTION</b>	Reverse Polarity, ESD & Surge Protected		
ABSOLUTE ACCURACY OVER FULL OPERATING TEMPERATURE			
<b>RANGE: ±180°</b>	±0.1° typical, ±0.2° absolute max		
<b>RESOLUTION</b>	0.05°		
<b>RESPONSE TIME</b>	6 user-configurable options from 4Hz to 0.3Hz		
ANALOG CURRENT & VOLTAGE OUTPUT PARAMETERS			
<b>OUTPUT RANGES</b>	Current	4..20 mA, 0..20 mA (Configurable within 0..24mA)	$R_{sense} \leq \frac{V_{supply} - 2.5}{0.020 - R_{wire}}$
	Voltage	0.5 V, 0..10V (Configurable within 0..10V)	1kΩ load min.
<b>SENSITIVITY<sup>2</sup></b>	Relative to Scaled Range		
<b>NULL (0°)</b>	Fully Configurable		
SWITCH OUTPUT PARAMETERS			
<b>OUTPUT MODE</b>	Open Collector Switch to Signal Common		
<b>TRIP MODES</b>	Fully Configurable (Window, Threshold, etc.)		
<b>SWITCH CAPABILITY</b>	250mA @ 36V max		
DIGITAL OUTPUT PARAMETERS			
<b>OUTPUT TYPE</b>	RS-485 Half Duplex (2-wire)		
<b>INCLINATION OUTPUT</b>	32-Bit IEEE Packetized Float		
<b>BAUD RATE</b>	125K Default (Configurable from 9600 to 250K)		
<b>BYTE FORMAT</b>	8 Data Bits, No Parity, 1-stop Bit, No Flow Control		
<b>PACKET FORMAT</b>	See Installation Manual for Packet Details and Commands		
<b>INFORMATION RATE</b>	Polled (up to 20 times/sec)		
LOGGING CAPABILITY (OPTIONAL)			
<b>SUPPLY CURRENT</b>	Additional 20mA @24VDC		
<b>LOGGING RESOLUTION</b>	Configurable in one minute increments		
<b>CARD TYPE</b>	μSD		

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 FORM NUMBER: H60002\_08/13 UPDATED: 2/22/19

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TEMPERATURE RANGES	
OPERATING TEMPERATURE	-40°F..+185°F (-40°C..+85°C)
STORAGE TEMPERATURE	-49°F..+194°F (-45°C..+90°C)
MECHANICAL CHARACTERISTICS	
HOUSING	Aluminum, IP68, All-weather, Submersible
WEIGHT	18.6 oz. (525 Grams)
MOUNTING HOLES	Accept #8 or M4.5 screws (See Dimensional Drawing)
MOUNTING PLANE	Flat Horizontal Surface (Factory Configurable for Vertical Mount)
OUTLINE DIMENSIONS	4.34" x 3.26" x 1.8" [110mm x 82.8mm x 45.7mm]
ELECTRICAL CONNECTION	See Electrical Connection Drawing
<b>Notes:</b>	
1. Supply Current varies depending on outputs connected. Digital output only assumes analog output section is always active however current loop is not connected.	
2. Sensitivity defined as (max analog output range) / (sensor input angle range). Ex, A current range set to 4..20mA with a ±30° input range will have a corresponding sensitivity of 16mA/60° or 0.267mA/°.	

**FIGURE 1: Dimensions (inches [mm])**

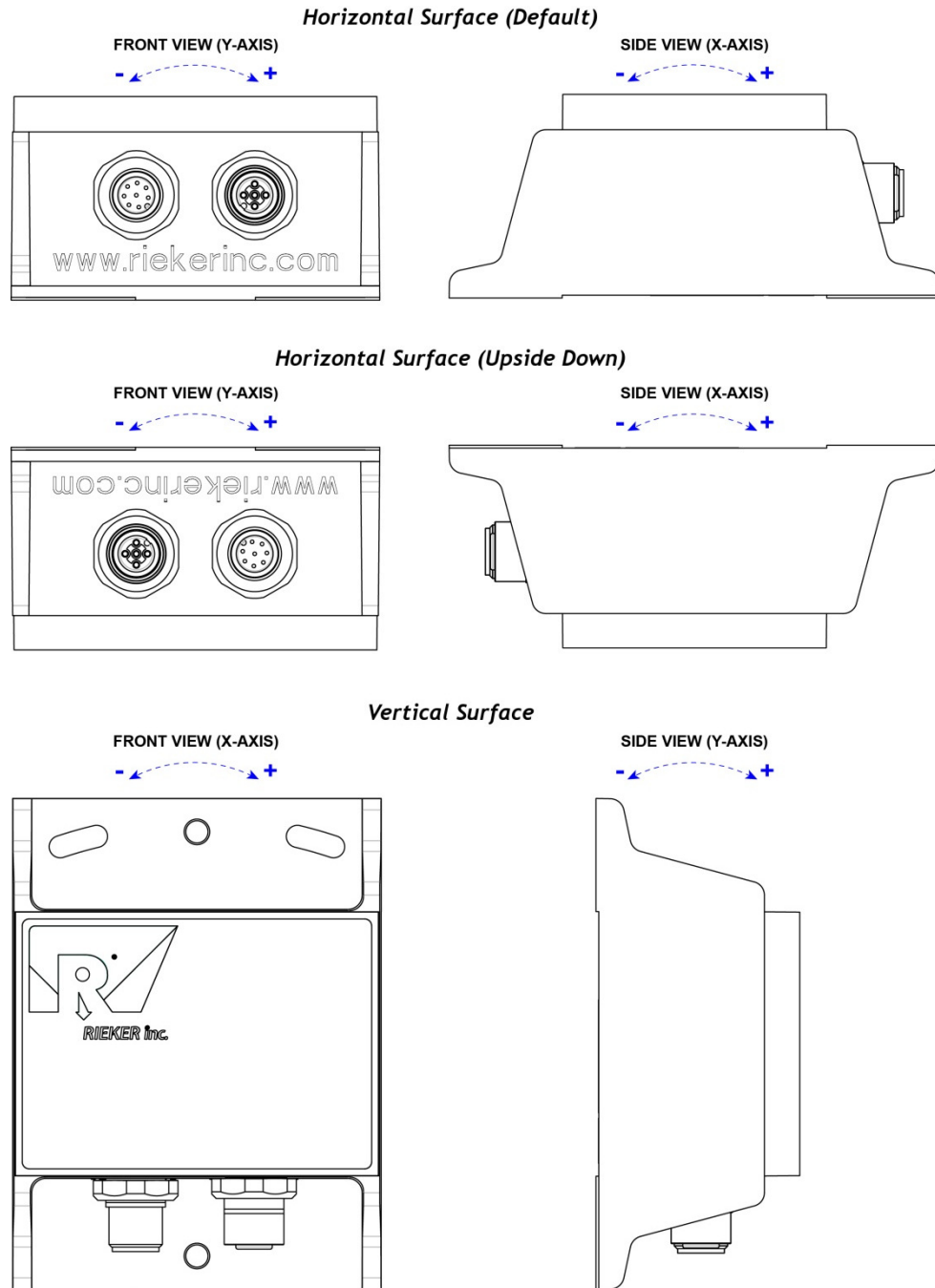


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**FIGURE 2: Mounting Positions**

**Note:** The factory default settings for mounting position (either horizontal or vertical) must be selected at time of order. Default output polarity shown is configurable at the factory (defined at time of order) or by the end user via the Flex Dev Kit that includes Rieker Flexware app, sold separately.

- Special H6MM Multi-Mount model (available exclusively through Digi-Key) allows the end user to select between horizontal and vertical mounting positions via a special Flex Dev Kit that includes Rieker Flexware app, also sold separately through Digi-key.



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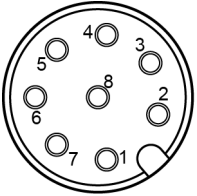
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**TABLE 2: MALE 8-PIN INPUT CONNECTOR**

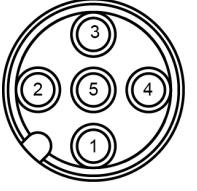
PIN	FUNCTION
1	SUPPLY VOLTAGE +11.. +36VDC
2	POWER / SIGNAL COMMON
3	RS485 D+ OR CAN HI
4	RS485 D- OR CAN LO
5	NO CONNECTION OR CAN SHIELD
6	ANALOG OUTPUT 1 (DEFAULT: X-AXIS)
7	ANALOG OUTPUT 2 (DEFAULT: Y-AXIS)
8	NO CONNECTION



M12 (male 8-pin)  
Pin Assignment  
FRONT VIEW

**TABLE 3: FEMALE 5-PIN DIGITAL OUTPUT DAISY CHAIN CONNECTOR**

PIN	FUNCTION
1	CAN SHIELD
2	SUPPLY VOLTAGE +11...+36VDC
3	POWER COMMON
4	RS485 D+ OR CAN HI
5	RS485 D- OR CAN LO







M12 (female 5-pin)  
Pin Assignment  
FRONT VIEW

**TABLE 4: CURRENT SENSE**

Rsense is dependent upon supply voltage and cable/wire resistance. Ensure the following equation is met:	QUICK REFERENCE	
	SUPPLY VOLTAGE	SENSE RESISTOR
$R_{sense} \leq \frac{V_{supply} - 2.5}{0.020} - R_{wire}$	12V	200-350 OHMS
	24V	200-1000 OHMS
	28V	200-1000 OHMS

**TABLE 5: ACCESSORIES (SOLD SEPARATELY)**

	<p><b>Flex Series Configurator Kit</b></p> <ul style="list-style-type: none"> <li>Flexware™ Toolkit Applications</li> <li>USB Interface Cable from Sensor to PC</li> <li>Also available through Digi-Key (pn Dev-Kit-C)</li> </ul>
	<p><b>Input / Output Interface &amp; Daisy-chain Cables</b></p> <ul style="list-style-type: none"> <li>I/O Cable, mating connector to sensor, varying cable lengths w/ pigtail leads for input power and output.</li> <li>Daisy-chain cable, M12 8-pin to M12 5-pin, varying cable length for sensor to sensor connection.</li> </ul>
	<p><b>Termination Resistor for Daisy-Chain Configuration</b></p> <ul style="list-style-type: none"> <li>Terminating Resistor M12 5-pin male</li> </ul>
	<p><b>Display Box</b></p> <ul style="list-style-type: none"> <li>Single or Dual Line LCD</li> <li>0.1° Resolution</li> <li>Battery or 12..24VDC input supply</li> </ul>

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