Flex Series - H6

General Information Brochure

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° to +85°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 ±180°. 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 ±180°*
- *Fully Temperature Compensated*
- *Multiple, Simultaneous, Configurable Outputs*
  - *Current*
  - *Voltage*
  - *Open Collector Switch*
  - *RS-485*
  - *CAN bus (J1939 or CanOPEN)*
  - *(Future) Optional Logging*
- *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° to +85°C Operating Temperature*
- *CE Certified*

INDUSTRIES

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

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Rieker Rugged. Rieker Reliable.™

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TABLE 1: H6 SENSOR SPECIFIATIONS		
INPUT PARAMETERS		
SUPPLY VOLTAGE	+11..36 VDC Non-Regulated	
SUPPLY CURRENT[1]	12mA @ 24VDC (Digital Output only)	
	20mA nominal @ 24VDC (Analog Output - no load)	
	65mA max @ 24VDC (Analog and Digital Outputs enabled)	
	75mA max @ 12VDC (Analog and Digital Outputs enabled)	
ANALOG MEASURING RANGE	Scalable within 360°	
DIGITAL MEASURING RANGE	±180°	
INPUT PROTECTION	Reverse Polarity, ESD & Surge Protected	
ABSOLUTE ACCURACY OVER FULL OPERATING TEMPERATURE		
RANGE: ±180°	±0.05º typical, ±0.09º absolute max	
RESOLUTION	<0.005º	
RESPONSE TIME	6 user-configurable options from 4Hz to 0.3Hz	
ANALOG CURRENT & VOLTAGE OUTPUT PARAMETERS		
	Current	**Voltage**
ANALOG OUTPUT RANGES	4..20 mA, 0..20 mA (Configurable within 0..24mA)	0..5 V, 0..10V (Configurable within 0..10V)
SENSE LOADING	$\frac{V_{supply}-2.5}{0.020}$ max	1kΩ load min.
ANALOG ACCURACY OVER TEMPERATURE[2]	<±0.015% FS	<±0.015% FS
ANALOG NULL ACCURACY @ 25°C[3]	<±0.005% FS	<±0.005% FS
ANALOG RESOLUTION	16 bits	
ANALOG SENSITIVITY[4]	Fully Configurable & Relative to Scaled Range	
SWITCH OUTPUT PARAMETERS		
OUTPUT MODE	Open Collector Switch to Signal Common	
TRIP MODES	Fully Configurable (Window, Threshold, etc.)	
SWITCH CAPABILITY	250mA @ 36V max	

Notes:

[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] Analog accuracy is based on the full scale range of 24mA for current outputs and 10V for voltage outputs.

[3] Null analog accuracy is the output error at room temperature and at the mid analog value (12mA for current outputs and 5V for voltage outputs) over the full scale range of the output (24mA for current outputs and 10V for voltage outputs).

[4] Sensitivity defined as (analog output range) / (sensor angle range). Ex, A current output range set to 4..20mA and a ±30° angle range will have a corresponding sensitivity of 16mA/60° or 0.267mA/°.

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DIGITAL OUTPUT PARAMETERS	
OUTPUT TYPE	RS-485 Half Duplex (2-wire)
INCLINATION OUTPUT	32-Bit IEEE Packetized Float
BAUD RATE	125K Default (Configurable from 9600 to 250K)
BYTE FORMAT	8 Data Bits, No Parity, 1-stop Bit, No Flow Control
PACKET FORMAT	See Installation Manual for Packet Details and Commands
INFORMATION RATE	Polled (up to 20 times/sec)
TEMPERATURE RANGES	
OPERATING TEMPERATURE	-40ºF..+185ºF (-40ºC..+85ºC)
STORAGE TEMPERATURE	-49ºF..+194ºF (-45ºC..+90ºC)
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

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

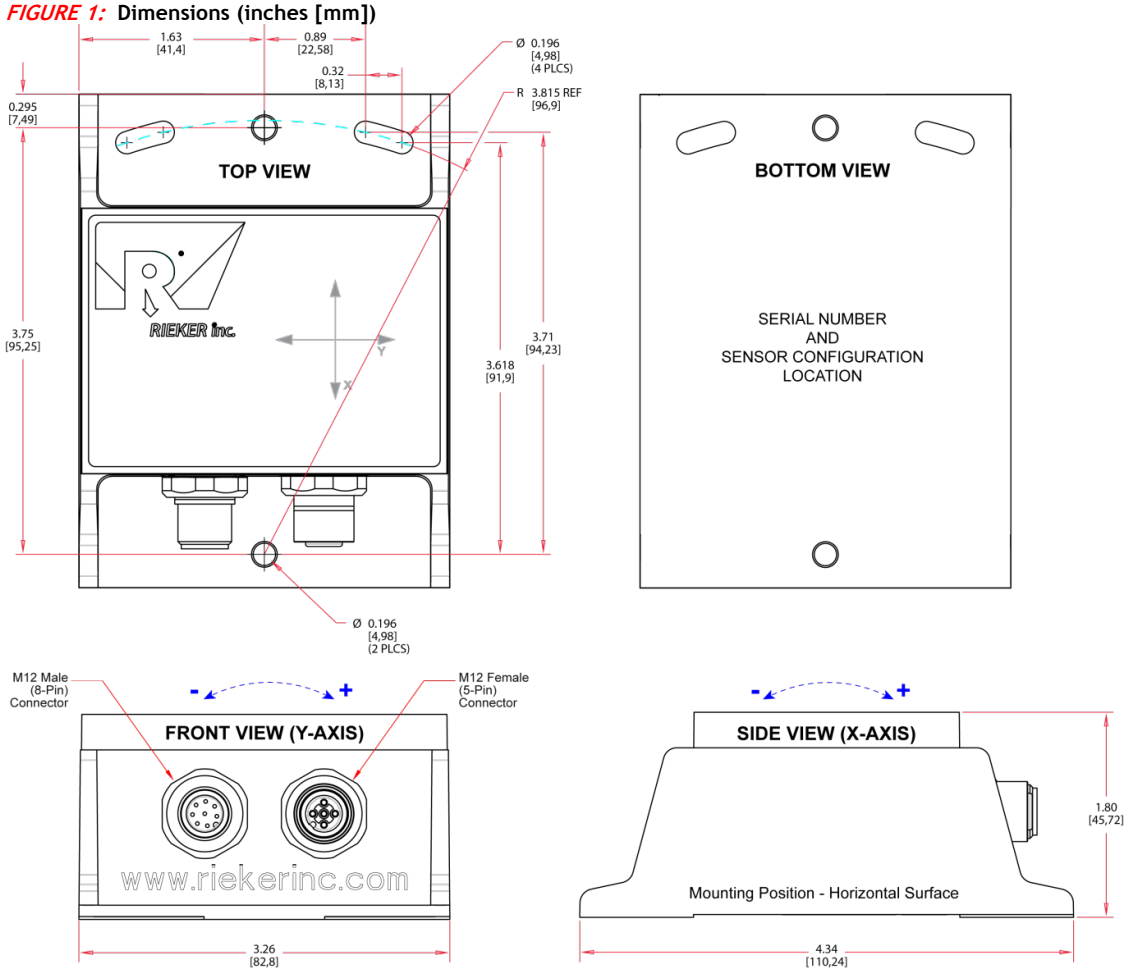

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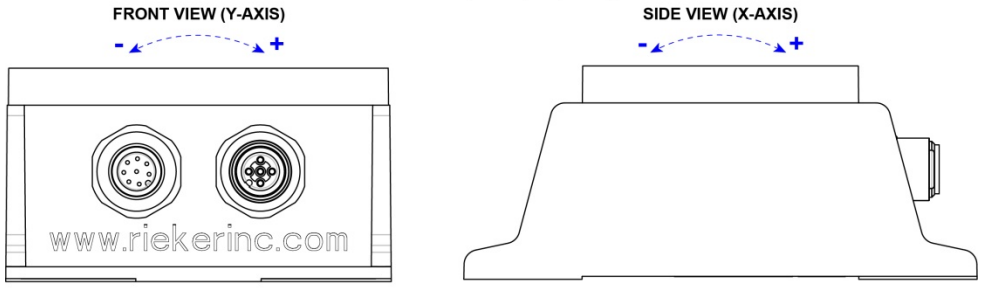
FIGURE 2: **Mounting Positions**

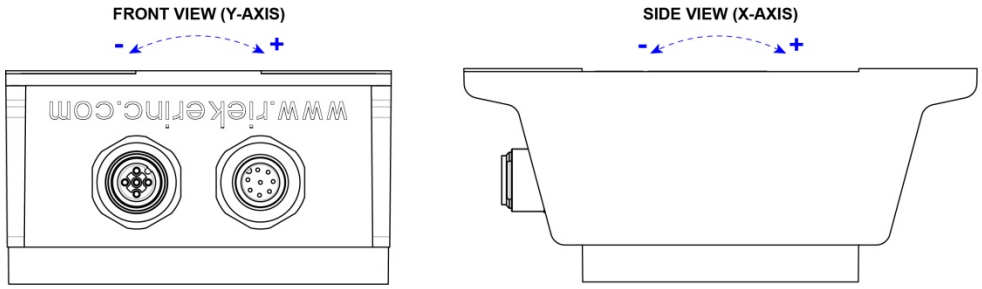
Note: The factory default settings for mounting position (either horizontal or vertical) must be selected at time of order. Default output polarity shown is configurable at the factory (defined at time of order) or by the end user via the Flex Dev Kit that includes Rieker Flexware app, sold separately.

- 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.

Horizontal Surface (Default)



Horizontal Surface (Upside Down)



Vertical Surface

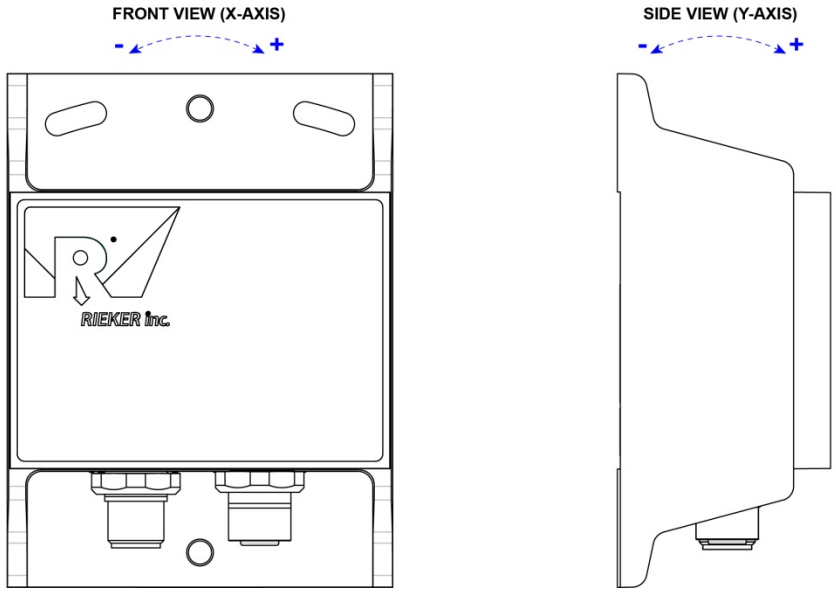


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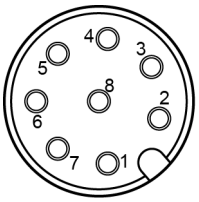
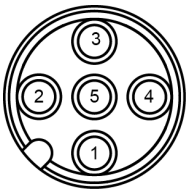
TABLE 2: MALE 8-PIN INPUT CONNECTOR	
PIN	**FUNCTION**
1	SUPPLY VOLTAGE +11.. +36VDC
2	POWER / SIGNAL COMMON
3	RS485 D+ OR CAN HI
4	RS485 D- OR CAN LO
5	NO CONNECTION OR CAN SHIELD
6	ANALOG OUTPUT 1 (DEFAULT: X-AXIS)
7	ANALOG OUTPUT 2 (DEFAULT: Y-AXIS)
8	NO CONNECTION



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:

$$\text{Rsense} <= \frac{\text{Vsupply} - 2.5}{0.020} - \text{Rwire}$$

QUICK REFERENCE	
SUPPLY VOLTAGE	SENSE RESISTOR
12V	200-350 OHMS
24V	200-1000 OHMS
28V	200-1000 OHMS

TABLE 5: ACCESSORIES (SOLD SEPARATELY)

Flex Series Configurator Kit
- Flexware™ Toolkit Applications
- USB Interface Cable from Sensor to PC
- Also available through Digi-Key (pn Dev-Kit-C)

Input / Output Interface & Daisy-chain Cables
- I/O Cable, mating connector to sensor, varying cable lengths w/ pigtail leads for input power and output.
- Daisy-chain cable, M12 8-pin to M12 5-pin, varying cable length for sensor to sensor connection.

Termination Resistor for Daisy-Chain Configuration
- Terminating Resistor M12 5-pin male

Display Box
- Single or Dual Line LCD
- 0.1° Resolution
- Battery or 12..24VDC input supply

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