Inclinometers for Hazardous Locations

Rieker Inc.

Current 0..24mA
Voltage 0..10V
Digital RS485
Dual Axis
Up to 360º

2022

Flex™ H6EX-B Installation Manual

Table of Contents

List of Figures

Sensor Description

The H6EX-B sensor is an inclinometer that provides high accuracy, dual axis inclination over a range of ±180° for Hazardous Locations. It is ATEX/IECEx & MET (US)/CSA approved for use in the following hazardous locations:

- Class I & II, Division 2
- Zone 2 & 22.

The sensor incorporates MEMS accelerometers referenced to gravity with integrated temperature compensation over the full operating range of -40° to +85°C for absolute accuracy. It has both digital (RS485) and analog (current or voltage) output options available. Each output is linear with respect to the input angle directly.

The digital RS485 output uses two-wire, half duplex communication, along with a Rieker specific protocol. This protocol can be used to measure the angle of both axes, as well as configure many of the parameters of the sensor.

The H6EX-B provides two continuous, fully configurable, analog outputs. These outputs are individually settable to current from 4mA to 20mA or voltage from 0V to 10V, are settable to any axis, and are factory or user configurable to match any angle range and min/max analog values.

Hazardous Location Information

The H6EX-B is approved to:

ATEX / IECEx (Gas):

Ⓔx II 3G Ex ec IIC T4 Gc (-40°C≤T_{amb}≤+85°C)

ATEX / IECEx (Dust):

Ⓔx III 3D Ex tc IIIC T135°C Dc (-40°C≤T_{amb}≤+85°C)

Certificate Numbers:

ATEX/IECEx: SEV 18 ATEX 0217

IECEx SEV 18.0042

US and Canada (Gas):

Class I, Division 2, Groups A, B, C, D T4

US and Canada (Dust):

Class II, Division 2, Groups F, G

US/CAN: MET E114209

The H6EX-B sensor is suitable for all areas except mining where gas and dust are not likely to occur in normal operation, but if so, will persist for a short period only. It is suitable for explosive gas Groups IIA to IIC & A to D and dust IIIC & F to G, and has temperature group T4 for gas & T135°C for dust. It also has an extended operating temperature range of -40°C to +85°C.

WARNING: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

AVERTISSEMENT: Si l'équipement est utilisé de façon non spécifiée par le fabricant, la protection assurée par l'équipement peut être altérée.

Applicable Standards

Normal Locations

For use in ordinary/unclassified locations, model H6EX-B has been investigated in accordance with:

- **UL/CSA 61010 -1 3rd ed.**-Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1

Hazardous Locations

For use in Class I Division 2, Class II Division 2, model H6EX-B has been investigated in accordance with:

- **CSA C22.2 No. 213-17:** Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, 2017
- **UL 121201:** Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, 2017

For use in Zone 2, model H6EX-B has been investigated in accordance with:

- **IEC 60079-0:2017, Edition 7.0 (EN 60079-0:2018)** – Explosive Atmospheres Part 0: General Requirements
- **IEC 60079-7:2017, Edition 5.1 (EN 60079-7:2015/A1:2018)** - Explosive Atmospheres Part 7: Equipment protection by increased safety "e"

For use in Zone 22, model H6EX-B has been investigated in accordance with:

- **IEC 60079-0:2017, Edition 7.0 (EN 60079-0:2018)** – Explosive Atmospheres Part 0: General Requirements
- **IEC 60079-31:2013, 2nd edition (EN 60079-31:2014)** - Explosive Atmospheres Part 31: Equipment Dust Ignition Protection by Enclosure "t"

EMC

- **EN 61326-1:2013** – Electrical equipment for measurement, control and laboratory use — EMC requirements
- **47 CFR Ch. 1 – FCC Part 15 Class A** – Radio Frequency Devices – Subpart B – Unintentional Radiators
- **ICES-003 – Issue 6 January 2016 Class A** –Interference-Causing Equipment Standard – Digital Apparatus

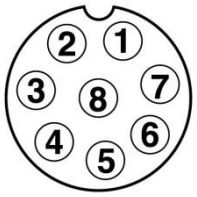
H6EX-B Instructions for Safety

Putting into Service

The H6EX-B may be powered by +12-24VDC. The connector wiring table is below:

TABLE 1: H6EX-B MALE 8-PIN INPUT CONNECTOR WIRING

PIN	FUNCTION
1	SUPPLY VOLTAGE +12..24VDC
2	POWER / SIGNAL COMMON
3	RS-485 D+
4	RS-485 D-
5	NO CONNECTION
6	ANALOG OUTPUT 1
7	ANALOG OUTPUT 2
8	NO CONNECTION



M12 (male 8-pin)
Pin Assignment
FRONT VIEW

TABLE 2: CURRENT SENSE

R_{sense} is dependent upon supply voltage and cable/wire resistance. Ensure the following equation is met:

$$R_{sense} \leq \frac{V_{supply} - 2.5}{0.020} - R_{wire}$$

QUICK REFERENCE	
SUPPLY VOLTAGE	**SENSE RESISTOR**
12V	200-350 OHMS

WARNING: EXPLOSION HAZARD. DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED.
AVERTISSEMENT – RISQUE D'EXPLOSION. NE PAS BRANCHER NI DÉBRANCHER SOUS TENSION

Notes:

A. All grounding path connections should be secure, permanent, visible, and accessible. The grounding path resistance from the farthest barrier to the grounding electrode should not exceed 1 ohm.
B. The installation must be in accordance with the National Electrical Code, NFPA 70, Articles 504 and 505, Canadian Electrical Code C22.1 Section 18, and ANSI/ISA-RP12.06.01.
C. The H6EX-B Sensor's Chassis Ground is NOT the same as the signal ground for the current output return. The analog output return must be connected to the POWER/SIGNAL COMMON (pin 2).

Use

The sensor is designed to measure dual-axis inclination and output an analog and/or digital signal.

Assembling and Dismantling

The H6EX-B shall not be serviced, dismantled, or re-assembled by the user.

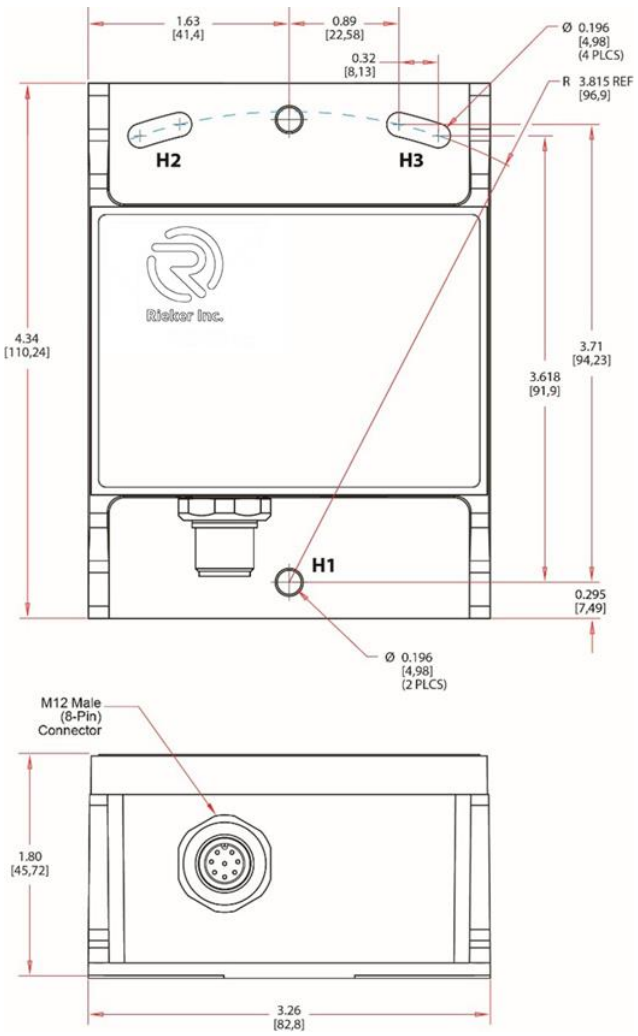
Maintenance

No maintenance is required.

Installation and Mounting:

1. On the mounting plane, prepare surface with three tapped holes, H1-H3 for M4/M4.5 mounting screws. H2& H3 are 3.815" [96.9mm] from H1. See *Figure 1*. NOTE that the single hole on the side with the two slots is not meant to be used for mounting.
2. Mount inclinometer to mounting plane using M4/M4.5 mounting screws. Use the two slots for fine adjustments.

FIGURE 1: **H6EX-B Dimensions and Mounting (Inches [Mm])**



Default Horizontal Mount Option: Axis Orientation

The 0° orientation for the horizontal-mount option H6EX-B is a desktop, level position.

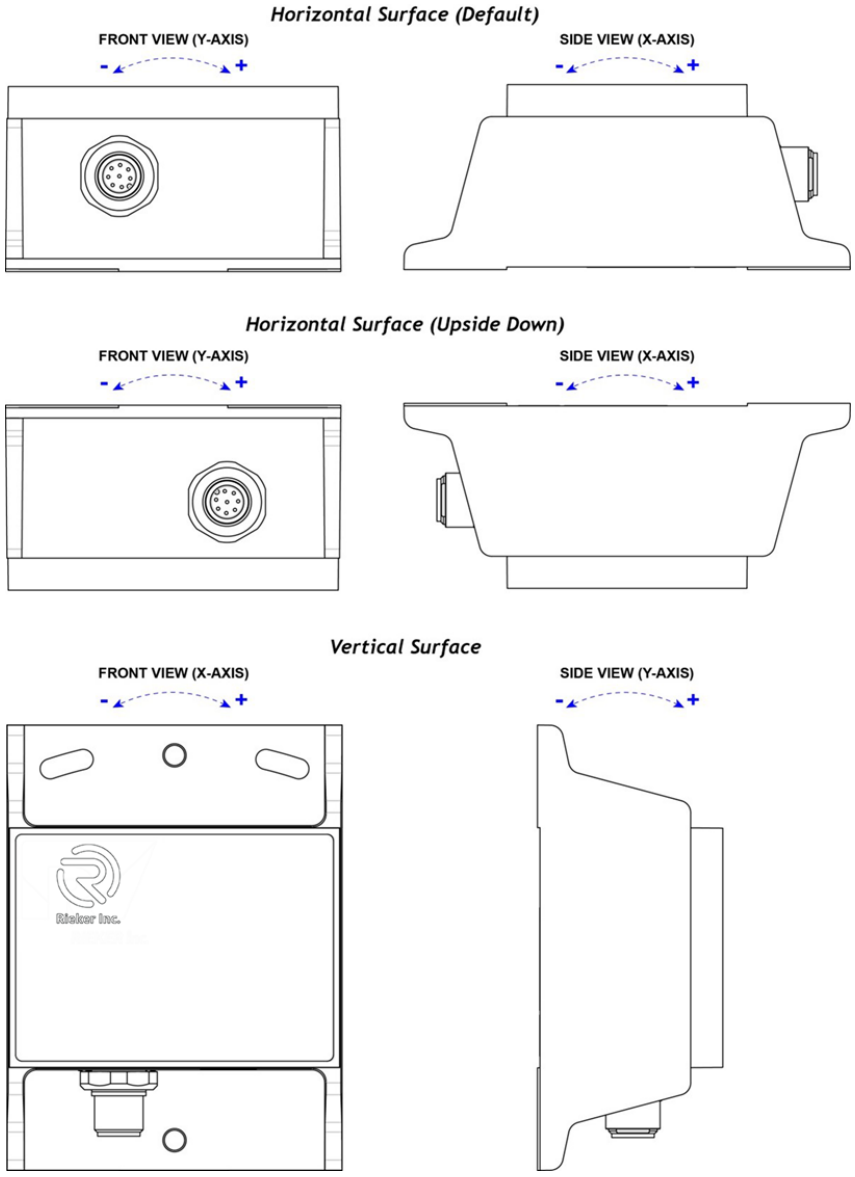
- For the X-axis, looking at the unit from the side with the connector facing to the right (top right of *Figure 2*), a clockwise rotation from the zero position is considered positive and a counter-clockwise rotation from the zero position is considered negative.
- For the Y-axis, looking at the unit from the front with the connector facing towards you (top left of *Figure 2*), a clockwise rotation from the zero position is considered positive and a counter-clockwise rotation from the zero position is considered negative.

Alternate Vertical Mount Option: Axis Orientation

The 0° orientation for the vertical-mount option of the H6EX-B is a vertical position with the connector down.

- For the X-axis, looking at the unit from the top side with the connector facing down (bottom left of *Figure 2*), a clockwise rotation from the zero position is considered positive and a counter-clockwise rotation from the zero position is considered negative.
- For the Y-axis, looking at the unit from the side with the connector facing down and the mounting surface to the left (bottom right of *Figure 2*), a clockwise rotation from the zero position is considered positive and a counter-clockwise rotation from the zero position is considered negative.

FIGURE 2: **H6EX-B Axis Orientations**



Adjustment

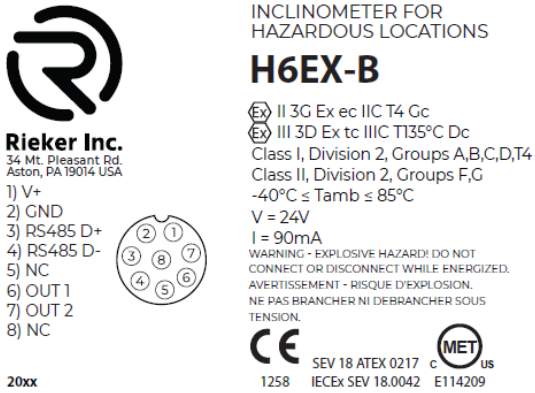
No mechanical adjustment is required.

No software adjustments of H6EX-B analog output parameters are permitted. Scaled analog parameters can only be factory-set and must be selected at time of purchase.

Markings

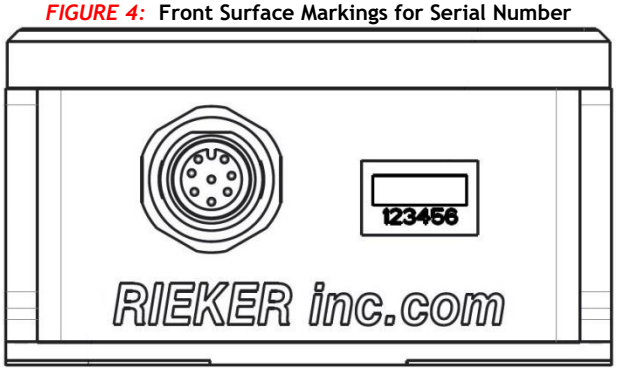
The H6EX-B shall be marked with one of the following markings:

FIGURE 3: **Top Surface Markings for Model and Hazardous Location Information**



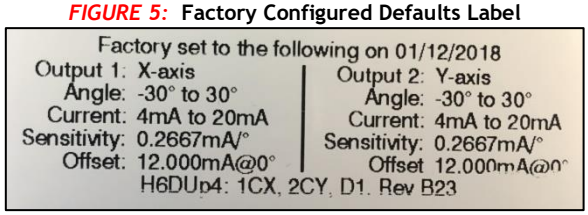
US/CAN/ATEX/IECEx

FIGURE 4: **Front Surface Markings for Serial Number**



In addition, the factory defaults label, located on the box of the H6EX-B sensor, provides the configured analog output parameters.

FIGURE 5: **Factory Configured Defaults Label**



Revision History

Revision	Revision Date	Description of Changes	Approved By
Rev A	01/20/2021	Initial Release	Caleb Swieson
Rev B	04/22/2021	Updated Controlled Document warning per CN 21-04-008.	Caleb Swieson
Rev C	06/07/2022	Update Logo per CN 22-05-003	Caleb Swieson