



FREDERICKS COMPANY

High Performance Sensing Solutions™

ApexOne™ Single Axis Analog Inclinometer

Part Number: **F160-21A-018-00**

Operating Specifications

Interface	Analog 0.5 to 4.5 V DC
Axes of Measurement	1
Operating Range	±60°
Linear Range	±50°
Accuracy (±50° @ 20 °C)	±0.25°
Accuracy (>50° @ 20 °C)	±0.5°
Accuracy (±50° @ -40 to 70 °C)	±0.5°
Accuracy (>50° @ -40 to 70 °C)	Monotonic
Repeatability (±60° @ -40 to 70 °C)	±0.1°
Resolution	≤0.01°
Analog Out Gain (Scale Factor)	0.0333 V/°
Null (Zero, 0°) Output	2.5 V DC
Response Time	≤250 ms
Supply Voltage	10 to 30 V DC
Supply Current (No Output Load)	5 mA @ 12 V DC
Analog Out Load	≥5 kΩ
Analog Out Source Current	≤2 mA
Operating Temperature	-40 °C to 70 °C
Storage Temperature	-40 °C to 85 °C
Startup Time	<1 second
Environmental Protection	IP67, UV stable
Mounting Orientation	Vertical or horizontal
Electrical Protection	Reverse polarity Over voltage Short circuit

Physical Characteristics

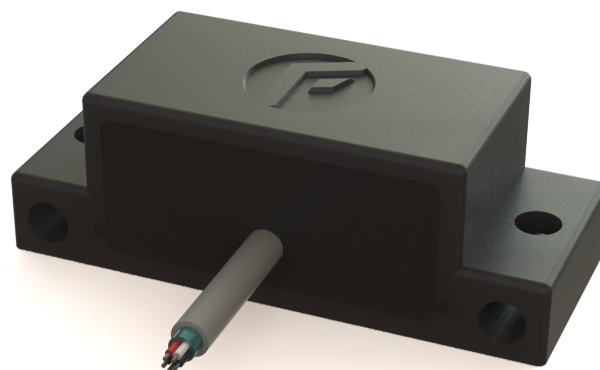
Enclosure	Glass filled PBT
Connector	6" (152 mm) cable, flying leads
Weight	100 g
Length	81.8 mm (3.22")
Width	34.9 mm (1.38")
Height	28 mm (1.10")
Hole Center	69.1 mm (2.72")
Hole Diameter	6.7 mm, 7.1 mm (¼" clearance)

Electrical Connections

Two Twisted Pairs	Pair 1: Red-Black, Pair 2: White-Black
Red (Pair 1)	Supply (+), 10 to 30 V DC
Black (Pair 1)	Supply (-)
White (Pair 2)	Analog Out (+)
Black (Pair 2)	Analog Out (-)

Certifications and Compliance

- CE certified to EN 55011, EN 61000
- RoHS, REACH Compliant



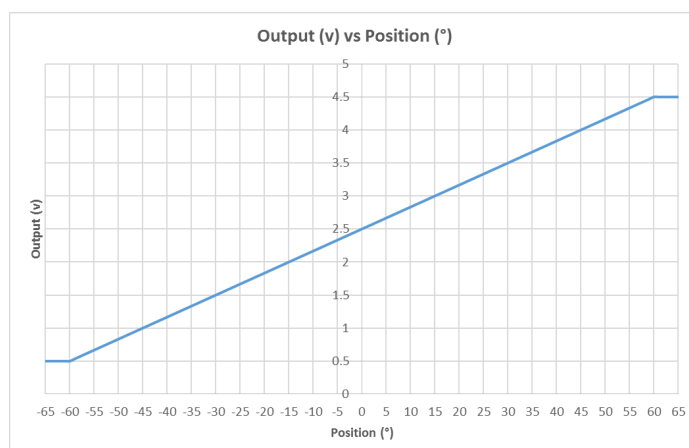
Description

The ApexOne™ single axis analog inclinometer is the first of the Apex family of products designed and manufactured in the U.S.A by Fredericks specifically for use on heavy industrial machinery. Its wide linear operating range and analog output combined with a uniquely designed vertically or horizontally mounted enclosure make it simple to integrate into new or existing equipment. Our comprehensive portfolio of tilt measurement products are engineered to outperform competing technology in the most demanding environments and serve industries ranging from RV leveling to aerospace applications and everything in between. Visit www.frederickscompany.com for more information.

Industries and Applications

- Construction, agricultural, and forestry machinery
- Aerial work platforms (AWPs), elevating work platforms (EWPs), and mobile elevating work platforms (MEWPS)
- Scissor lifts (height sensor), telescopic and articulating boom lifts (boom angle sensor)
- Solar tracking

Operating and Linear Range Output Behavior



Analog Output Conversion

$V_{Out} = 0.5 \text{ V DC to } 4.5 \text{ V DC output}$

$V_{Offset} = V_{Out} \text{ at } 0^\circ \text{ tilt, } 2.500 \text{ V DC typical}$

$$\text{Tilt Angle } (^\circ) = \frac{V_{Out} - V_{Offset}}{0.0333}$$



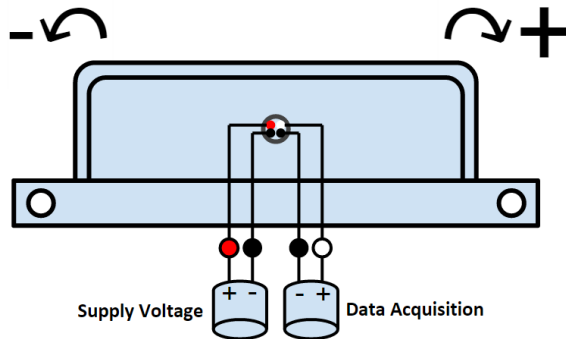
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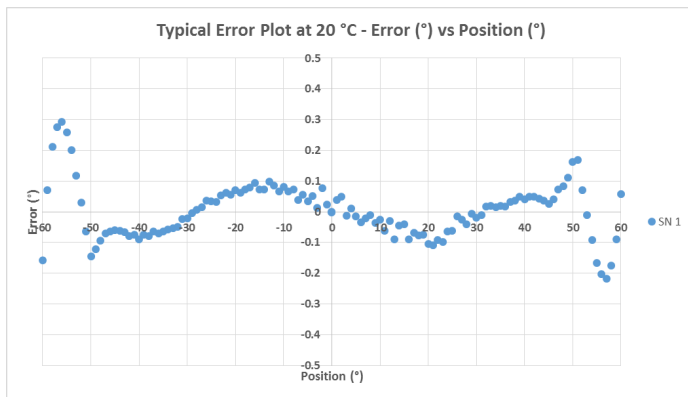
ApexOne™ Single Axis Analog Inclinometer

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Functional Diagram and Wiring Example



Typical Accuracy Plot



Product Benefits

- Low power consumption
- Excellent resolution, repeatability, and accuracy
- Superior performance in extreme environments
- Excellent customer support
- Designed and manufactured in the USA

Related Products

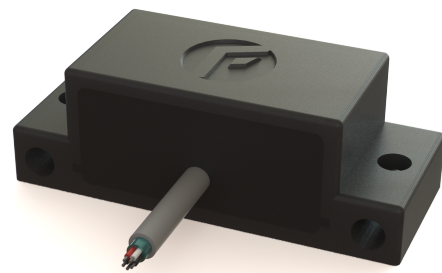
F160-21A-018-01

±60° Single Axis Analog Inclinometer
Deutsch DTF13-4P connector

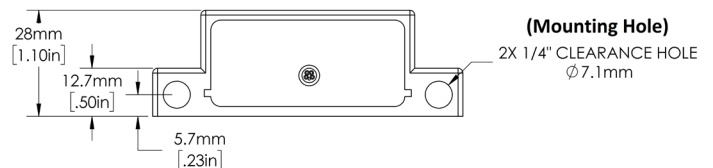
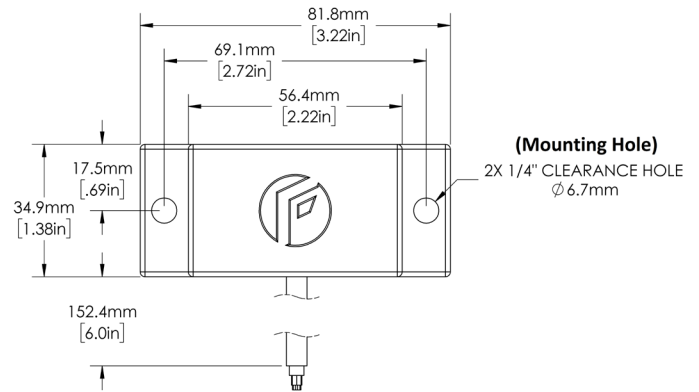


F160-21A-018-02

±60° Single Axis Analog Inclinometer
TE AMP VAL-U-LOK 1586042-4 4 pin connector



Dimensional Drawings



Mounting Notes

The ApexOne™ inclinometer includes two sets of orthogonal (perpendicular) mounting holes, allowing the end user to mount the unit vertically or horizontally.

Company Information

Specialty manufacturing services that promise precision. For more than 80 years, Fredericks has specialized exclusively in tilt and vacuum measurement products. Today, our precise manufacturing processes produce the most accurate and advanced products on the market, ensuring perfection every time. A true specialty service provider, we are willing and eager to put our experience and capabilities to good use, helping OEMs achieve even the most complex designs.

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