±60° Analog/PWM Dual-Axis Inclinometer
Part Number: 0729-1753-99

Operating Specifications

Interface	Analog 0 to V_{dd} and PWM
Supply Voltage (V_{dd})	3.3 V DC to 5 V DC
Supply Current	15 mA (5 V DC), 10 mA (3.3 V DC)
Analog Input Resolution	16 bits (10 bits oversampled)
Operating Range	±60º
Linear Range	±25º
Axes of Measurement	2
Repeatability	±0.1°
Resolution	≤0.003°
Null Offset	±5°
Long Term Stability/Drift	≤0.1°
Null Temperature Coefficient	≤0.006° per °C
Scale Temperature Coefficient	0.1% per °C
Materials	Contains magnetic metals
Operating Temperature	-40 °C to 85 °C
Storage Temperature	-40 °C to 125 °C
Temperature Sensor Range	-40 °C to 125 °C
Time Constant (63.2% of output)	≤250 ms

Physical Characteristics

Housing	None (PCBA)
Electrical Connections	7 Pin, 2.54 mm (0.1”) spacing
Weight	5.5 g
Length	31.75 mm (1.25”)
Width	31.75 mm (1.25”)
Height	16.10 mm (0.63”)
Hole Center	26.67 mm (1.05”)

Ordering Information

Part Number	Description
0729-1753-99	Inclinometer, ±60°, 2 Axis, Analog/PWM

Related Products

Part Number	Description
0729-1751-99	Inclinometer, ±60°, 2 Axis, SPI
0729-1752-99	Inclinometer, ±60°, 2 Axis, RS-232
0729-1754-99	Inclinometer, ±60°, 2 Axis, RS-485
0729-1755-99	Inclinometer, ±60°, 2 Axis, Analog
0729-1759-99	Inclinometer, ±60°, 2 Axis, RS-232
0729-1760-99	Inclinometer, ±60°, 2 Axis, RS-485
0729-1765-99	Inclinometer, ±25°, 2 Axis, Analog/RS-232
0729-1763-XX	Tilt Switch, ±1° to ±45°, 2 Axis, Relay/RS-232
0729-1736-99	Tilt Switch, ±1° to ±45°, 2 Axis, Relay/RS-232
0729-1757-99	Tilt Switch, ±1° to ±45°, 1 Axis, Open Collector
0729-1758-99	Tilt Switch, ±1° to ±45°, 1 Axis, Open Collector

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Description

The 0729-1753-99 dual-axis Analog and PWM inclinometer is part of Fredericks’ inclinometer family of products designed and manufactured in the USA for use in industrial, commercial, and military applications. It combines the 0717-4318-99 wide-range, dual-axis electrolytic tilt sensors and the 1-6200-007 signal conditioning electronics in one easy to use package.

This inclinometer has superior tolerances and unit to unit performance with an economic design, making it an excellent solution for a variety of applications in many markets and industries.

Key Features and Benefits

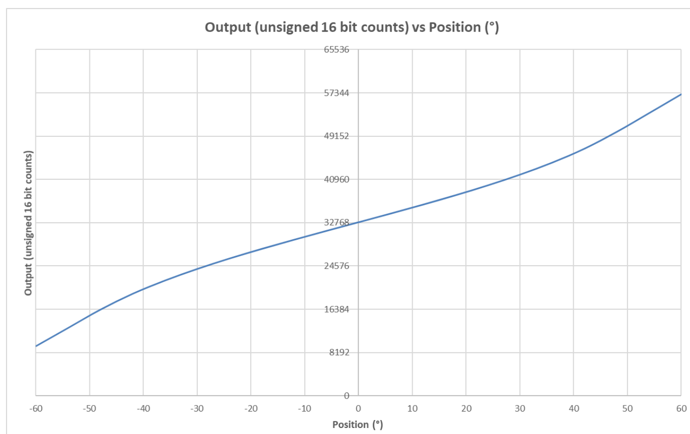
- ±0.1° repeatability, ≤0.003° resolution, very high accuracy
- ≤0.1° long term drift with an extremely long life
- Minimal drift compared to MEMS devices
- -20 °C to 85 °C operating temperature for industrial applications
- Live text and video chat technical support

Applications

- Geotechnical and structural monitoring
- Construction tools, laser leveling
- Construction machinery and equipment
- Aerial work platforms (AWP), elevating work platforms (EWP)
- Mobile elevating work platforms (MEWPS)

View the full list at www.frederickscompany.com/markets.

Operating Range Behavior



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Analog Output Description

V_{dd} = 3.3 V DC	0 V DC to 3.3 V DC, 0° tilt = 1.65 V DC
V_{dd} = 5.0 V DC	0 V DC to 5 V DC, 0° tilt = 2.50 V DC

Note that the analog output is integrated from the PWM output and this circuit will be sensitive to moisture. An enclosure or conformal coating may be necessary in higher humidity environments.

PWM Output Description

Frequency	122 Hz
Duty Cycle	1% to 99%, 0° tilt = 50% duty cycle
Resolution	16 bits

Electrical Connections

J1 Pin 1 (+5)	Supply (+, V_{dd})
J1 Pin 2 (C)	Supply (-, V_{ss})
J1 Pin 3 (T)	Temperature analog output (0 to V_{dd})
J1 Pin 4 (XA)	X axis analog output (0 to V_{dd})
J1 Pin 5 (YA)	Y axis analog output (0 to V_{dd})
J1 Pin 6 (XP)	X axis PWM output
J1 Pin 7 (YP)	Y axis PWM output
L1	Dual axis sensor connection
J3	Single axis sensor x axis connection
J4	Single axis sensor y axis connection

Converting Temperature Values

The board temperature output is a 10-bit value (0 to 1023). To convert that value to a temperature in °C, use the following equation:

Temperature in °C = (((output/1023)*supply voltage)-0.5)/0.01

Mounting Notes

The 0729-1753-99 and all inclinometers in this series must be mounted horizontally (parallel to the surface of the earth and perpendicular to the force of gravity). For best performance, isolate the unit from vibrations when mounting it.

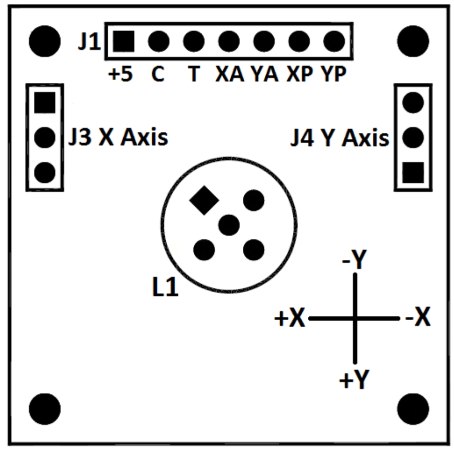
Certifications and Ratings

- RoHS Compliant

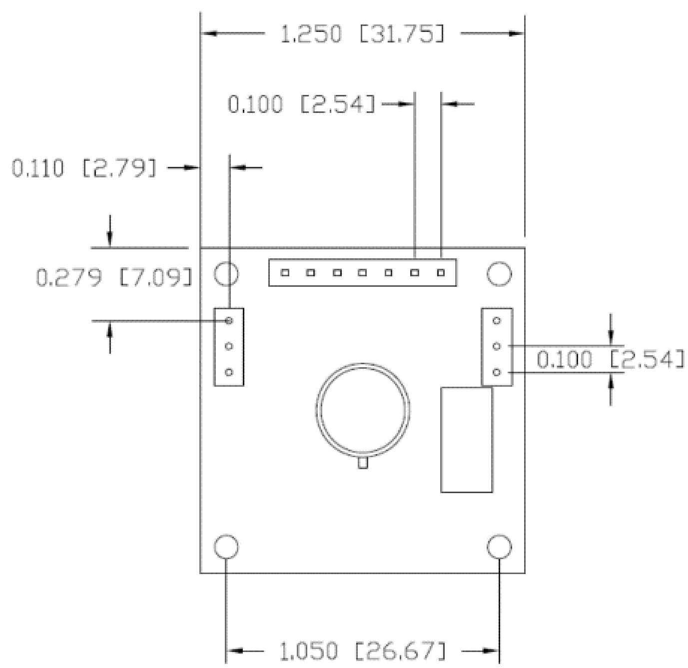
Additional Documentation

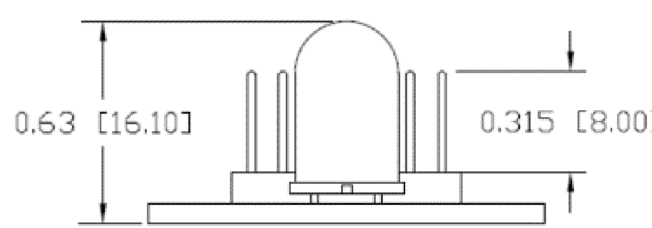
AN1000	Electrolytic Tilt Sensor Excitation
AN1001	Temperature Compensation of Electrolytic Tilt Sensors
AN1003	Configuring Tera Term to Use with TFC Tilt Products
AN1005	Converting Tilt Angle to Degrees
AN1006	Obtaining Measurements from TFC Signal Conditioners
Article	Structural Monitoring Case Study: Resensys

Pin Diagram and Direction of Measurement



Dimensional Drawings





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Company Information

Specialty Manufacturing Services That Promise Precision - Since 1935, The Fredericks Company has been a global provider and U.S. designer and manufacturer of the highest performance tilt and vacuum measurement products on the market, with manufacturing processes that ensure the reliability of our products.

Tilt Measurement Products and Sensors That Set Standards - Fredericks' comprehensive tilt measurement product portfolio offers electrolytic tilt sensors, inclinometers, and tilt switches. Engineered to outperform competing technology, our tilt sensors are accurate and repeatable with excellent resolution. Our tilt measurement products have no planned obsolescence and serve industries ranging from construction and RV leveling to aerospace applications and everything in between.

A Partnership That Prioritizes Uptime, Lead Time, and Service - Fredericks guarantees customer satisfaction and our "not too big, not too small" operation is what enables us to offer a true partnership experience. Our dedicated representatives and engineers offer exceptionally responsive service and the fastest lead times in the industry, knowing that uptime is the key to your success. With anytime access to our leadership team and solutions that enhance your products, you will feel the Fredericks difference.

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