



±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 angle | ±60° |
| Linear Range | ±25° |
| 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) | ≤100 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

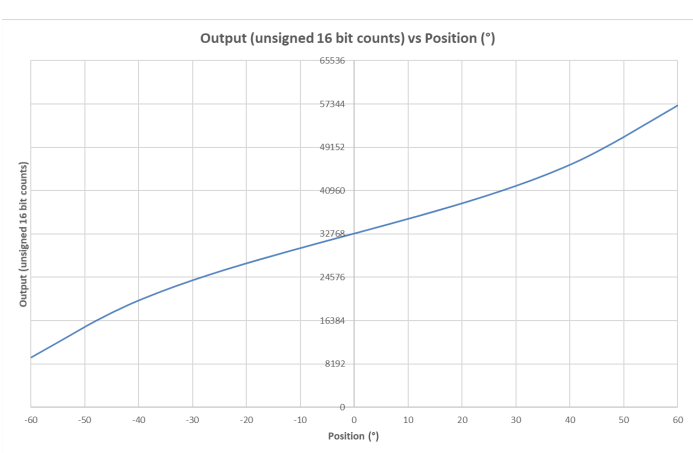
- ±0.1° repeatability, ≤0.003° resolution, very high accuracy
- ≤0.1° long term drift with an extremely long life
- Minimal drift compared to MEMS devices
- -20 °C to 85 °C operating temperature for industrial applications
- Live text and video chat technical support

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:

$$\text{Temperature in } ^\circ\text{C} = (((\text{output}/1023) * \text{supply voltage}) - 0.5) / 0.01$$

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.

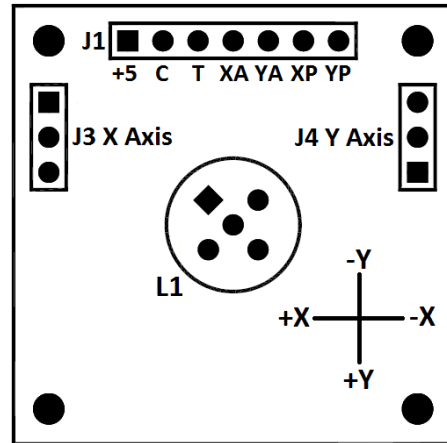
Certifications and Ratings

- RoHS Compliant

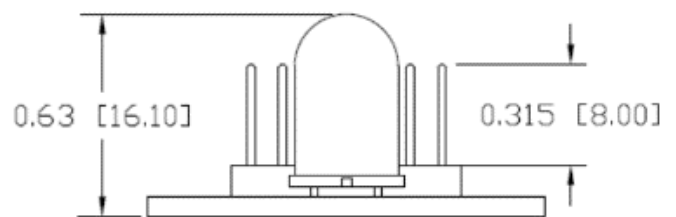
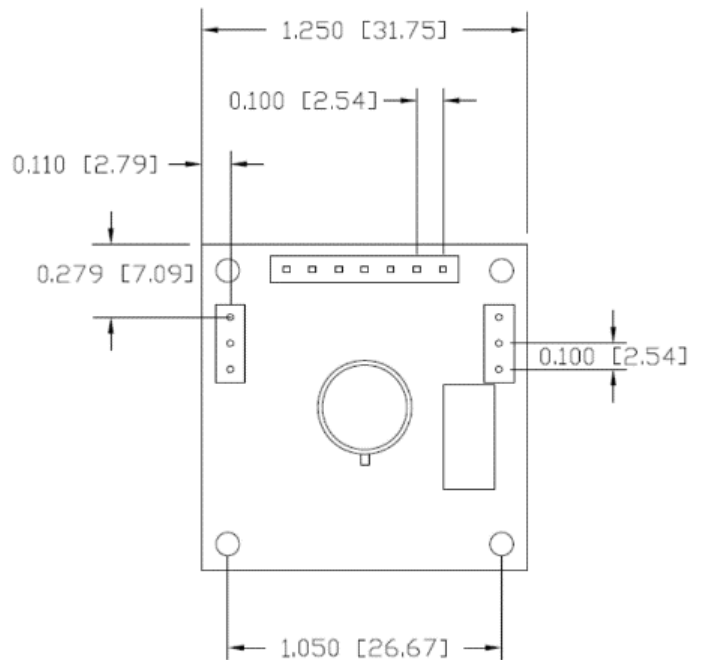
Additional Documentation

| | |
|-------------------------|---|
| 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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