



±60° RS-485 Dual-Axis Inclinometer

Part Number: **0729-1769-99**

Operating Specifications

Interface	RS-485
Supply Voltage	3.3 V DC to 5 V DC
Supply Current	<10 mA
Analog Input Resolution	16 bits (10 bits oversampled)
Operating Range	±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)	≤250 ms

Physical Characteristics

Housing	None (PCBA)
Electrical Connections	Molex 0705430006 (7 Pin)
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
0729-1769-99	Inclinometer, ±60°, 2 Axis, RS-485, PCBA

Related Products

Part Number	Description
0717-4318-99	Tilt Sensor, ±60°, 2 Axis
1-6200-008-MV7	Signal Conditioner, 1 or 2 Axis, RS-485
0729-1751-99	Inclinometer, ±60°, 2 Axis, SPI
0729-1752-99	Inclinometer, ±60°, 2 Axis, RS-232
0729-1753-99	Inclinometer, ±60°, 2 Axis, Analog/PWM
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
0729-1767-99	Inclinometer, ±60°, 2 Axis, Analog
0729-1768-99	Inclinometer, ±60°, 2 Axis, 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
F203-00A-212-00	Inclinometer, ±3°, 2 Axis, Analog/RS-232
F225-00T-003-01	Inclinometer, ±25°, 2 Axis, UART/TTL

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Description

The **0729-1769-99** dual-axis RS-485 inclinometer is part of Fredericks' inclinometer family of products designed and manufactured in the USA for use in industrial, commercial, and military applications.

The **0729-1769-99** includes the **0717-4318-99** wide-range, dual-axis electrolytic tilt sensor, and **1-6200-008-MV7** signal conditioning electronics.

This inclinometer has superior tolerances and unit-to-unit performance with an economical design, making it an excellent solution for various applications in many markets and industries.

Key Features and Benefits

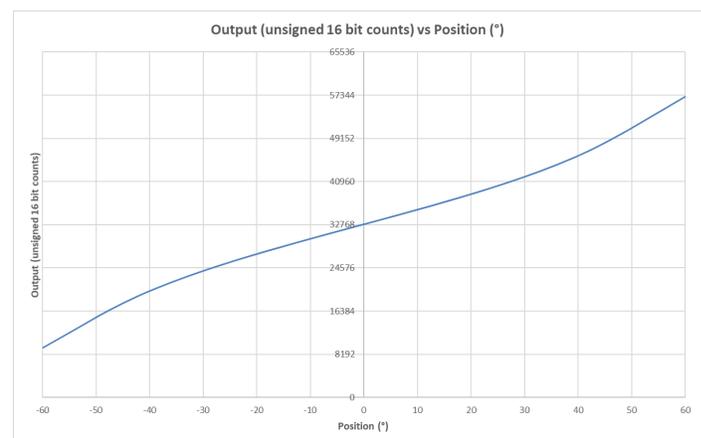
- ±0.1° repeatability, ≤0.003° resolution, very high accuracy
- ≤0.1° long term drift with an extremely long life
- Minimal drift compared to MEMS devices
- -40 °C to 85 °C operating temperature for industrial applications
- Live text and video chat technical support

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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RS-485 Information

Baud Rate (default 9600)	1200 to 38400
Data Bits	8
Parity	None
Stop Bits	1
Address (default 99)	01 to 99
Maximum Signal Conditioners on Bus	32

RS-485 Commands (assume default address 99)

*9911#	X axis output (0 to 65535)
*9921#	Y axis output (0 to 65535)
*9941#	Temperature output (0 to 1023)
*9980#	Read product information
*9981Axx#	Change address to xx (01 to 99)
*9982D#	Read user information
*9984Z#	Set current position as zero
*9984R#	Clear saved zero position
*9988Rx#	Change baud rate to x (1 to 6)
*9989B#	Reset to factory default settings

Note: Download the [1-6200-008 instruction manual](#) for additional commands and details

Electrical Connections

J1 Pin 1 (+5)	Supply (+)
J1 Pin 2 (C)	Supply (-)
J1 Pin 3 (C)	Ground
J1 Pin 4 (B)	RS-485 B (-)
J1 Pin 5 (A)	RS-485 A (+)
J1 Pin 6 (C)	Ground
J1 Pin 7 (C)	Ground
L1	Dual-axis sensor connection
J3	Single axis sensor x axis connection
J4	Single axis sensor y axis connection

Example RS-485 Command and Response Byte Values

Retrieve X axis tilt value from a signal conditioner with address 99 which returns 32768 (0° tilt):

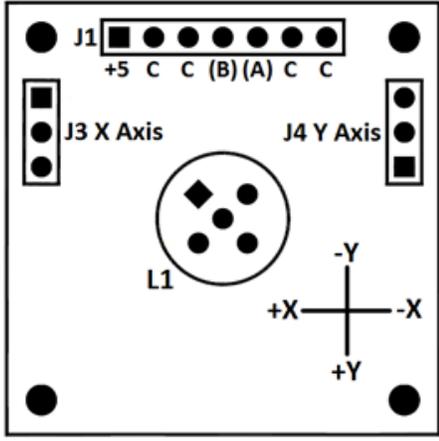
Command

Byte	0	1	2	3	4	5
ASCII	*	9	9	1	1	#
Hex	0x2A	0x39	0x39	0x31	0x31	0x23

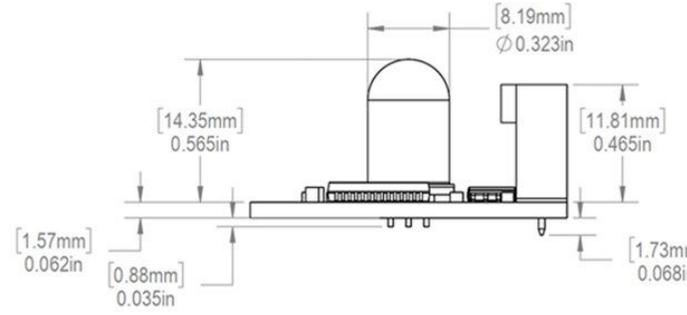
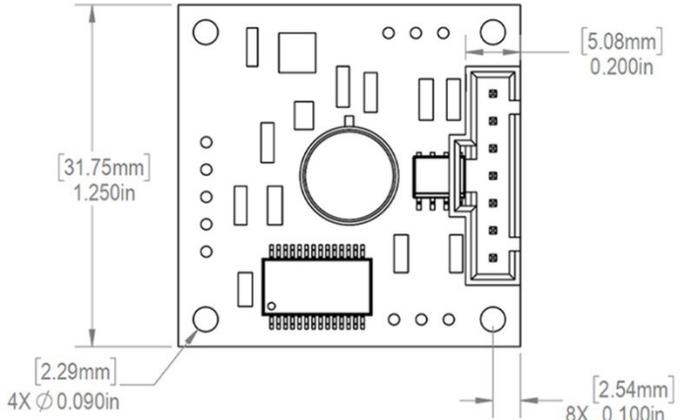
Response

Byte	0	1	2	3	4	5	6
ASCII	3	2	7	6	8	<lf>	<cr>
Hex	0x33	0x32	0x37	0x36	0x38	0x0A	0x0D

Pin Diagram and Direction of Measurement



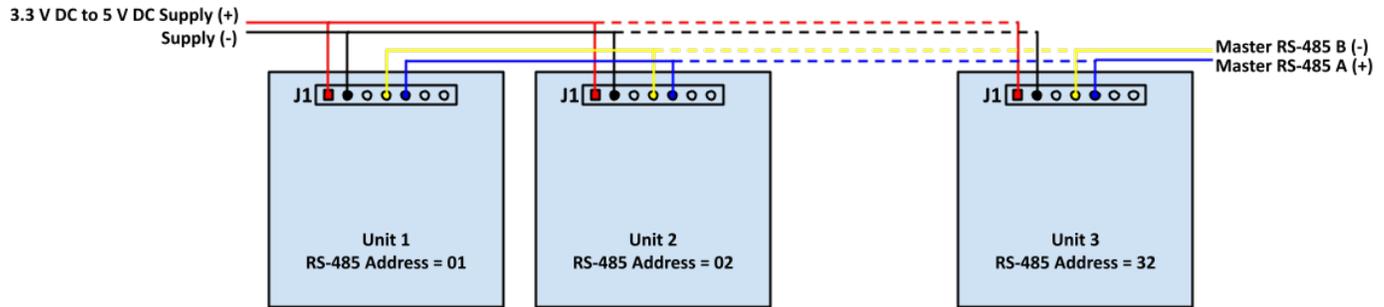
Dimensional Drawings





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Example RS-485 Bus Configuration



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

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
Manual	1-6200-008 Instruction Manual
Article	Structural Monitoring Case Study: Resensys

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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