

## ±60° RS-485 Dual-Axis Inclinometer

Part Number: **0729-1754-99**

### Operating Specifications

Interface	RS-485
Supply Voltage	3.3 V DC to 5 V DC
Supply Current	9 mA (5 V DC), 6 mA (3.3 V DC)
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)	≤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
0729-1754-99	Inclinometer, ±60°, 2 Axis, RS-485

### Related Products

Part Number	Description
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
0729-1755-99	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

### Description

The **0729-1754-99** 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. It combines the **0717-4318-99** wide-range, dual-axis electrolytic tilt sensors and the **1-6200-008** 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

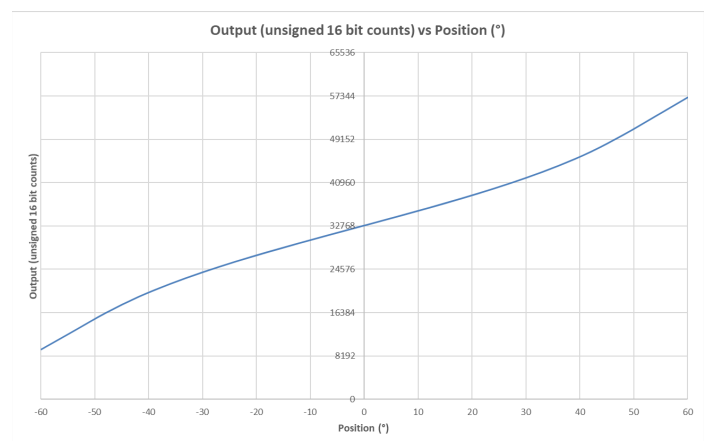
- ±0.1° repeatability, ≤0.003° resolution, very high accuracy
- ≤0.1° long term drift with an extremely long life
- Minimal drift compared to MEMS devices
- -20 °C to 85 °C operating temperature for industrial applications
- Live text and video chat technical support

### Applications

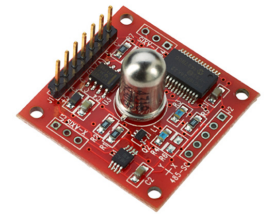
- [Geotechnical and structural monitoring](#)
- [Construction tools, laser leveling](#)
- [Construction machinery and equipment](#)
- Aerial work platforms (AWP), elevating work platforms (EWP)
- Mobile elevating work platforms (MEWPS)

View the full list at [www.frederickscompany.com/markets](http://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):

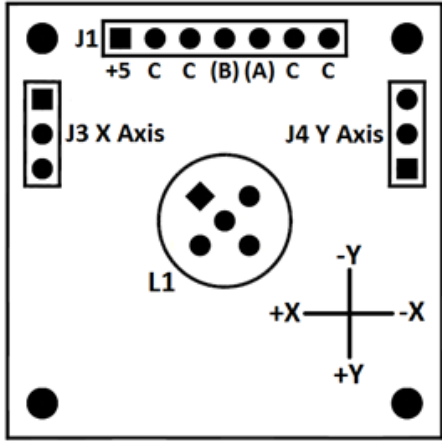
**Command**

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

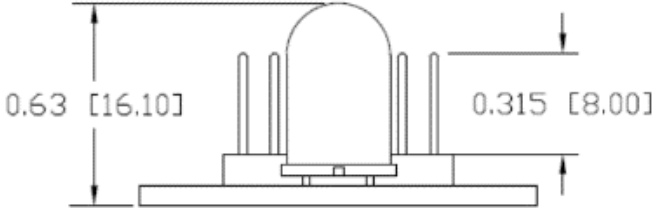
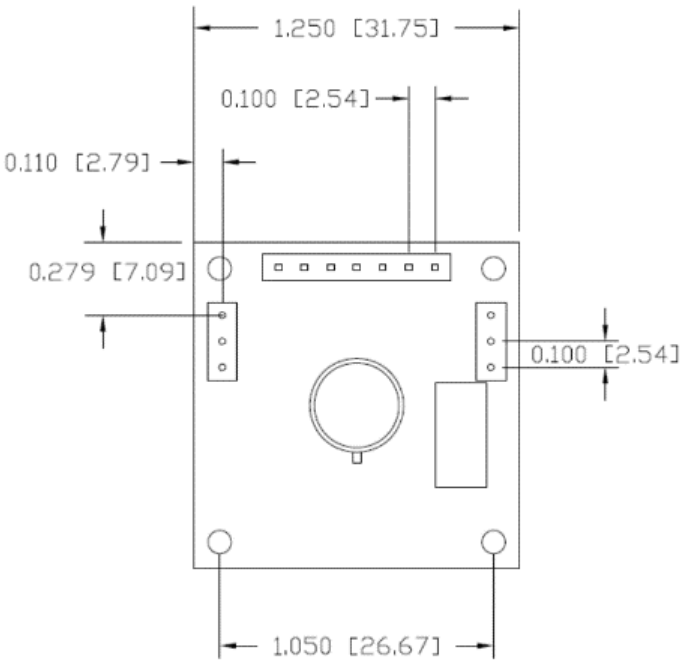
**Response**

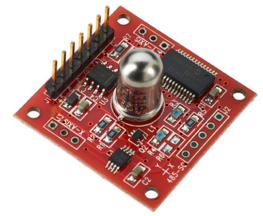
Byte	0	1	2	3	4	5	6
ASCII	3	2	7	6	8	<lf>	<cr>
Hex	0x33	0x32	0x37	0x36	0x38	0x0A	0x0D

**Pin Diagram and Direction of Measurement**



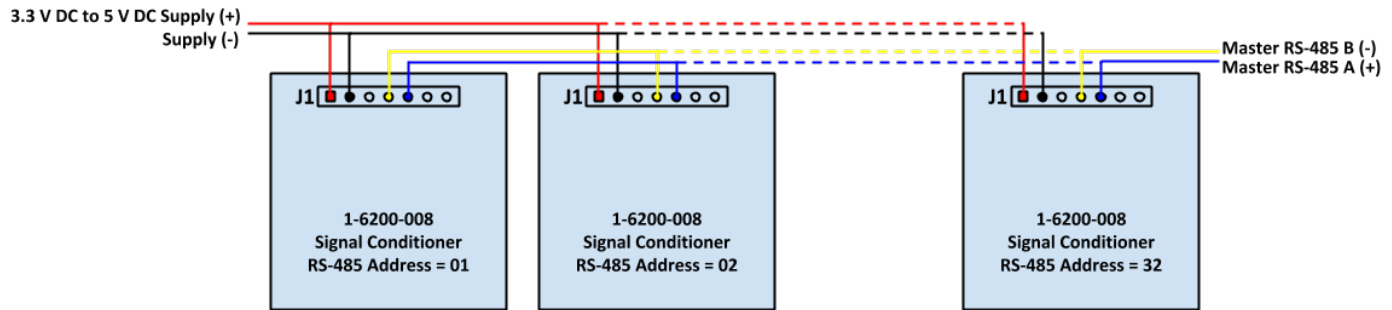
**Dimensional Drawings**





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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**

The 0729-1754-99 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	<a href="#">Electrolytic Tilt Sensor Excitation</a>
AN1001	<a href="#">Temperature Compensation of Electrolytic Tilt Sensors</a>
AN1003	<a href="#">Configuring Tera Term to Use with TFC Tilt Products</a>
AN1005	<a href="#">Converting Tilt Angle to Degrees</a>
AN1006	<a href="#">Obtaining Measurements from TFC Signal Conditioners</a>
Manual	<a href="#">1-6200-008 Instruction Manual</a>
Article	<a href="#">Structural Monitoring Case Study: Resensys</a>

**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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