



±3° Analog/RS-232 Dual-Axis Inclinometer

Part Number: F203-00A-212-00

Operating Specifications

Digital Interface	RS-232
Analog Output	0 to 5 V DC
Supply Voltage	7 to 16 V DC
Supply Current	<10 mA
Operating Range	±3°
Linear Range	±1°
Axes of Measurement	2
Repeatability	±0.001°
Resolution	≤0.001°
Null Offset (Mounting Offset)	±2°
Long Term Stability/Drift	≤0.005°
Null Temperature Coefficient	≤0.0005° per °C
Scale Temperature Coefficient (±1°)	0.375%
Operating Temperature	-20° to 50 °C
Storage Temperature	-40° to 100 °C
Time Constant (63.2% of final output)	≤1 second

Physical Characteristics

Housing	None
Electrical Connections	8-pin Molex 0015910080
Mating Connector	8-Pin Molex 0022552081
Weight	20 grams
Length	45 mm (1.78")
Width	45 mm (1.78")
Height	11 mm (0.43")

Ordering Information

Part Number	Description
F203-00A-212-00	Inclinometer, ±3°, 2 Axis, Analog/RS-232

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 and 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
F225-00T-003-01	Inclinometer, ±25°, 2 Axis, UART/TTL
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 [F203-00A-212-00](#) analog/RS-232 inclinometer utilizes two Fredericks 0703-0712-99 narrow-range single axis electrolytic tilt sensors and the [1-6200-012](#) 16-bit analog/RS-232 signal conditioner. The use of high accuracy single axis sensors and 16-bit ADCs make this inclinometer ideal for high precision tilt measurement. This inclinometer has superior tolerances and unit to unit performance with an economic design, making it an excellent solution for many markets and applications.

Key Features and Benefits

- ±0.001° repeatability, ≤0.001° resolution, very high accuracy
- ≤0.001° long term drift with an extremely long life
- Minimal drift compared to MEMS devices
- -20 °C to 50 °C operating temperature for industrial applications
- Live text and video chat technical support

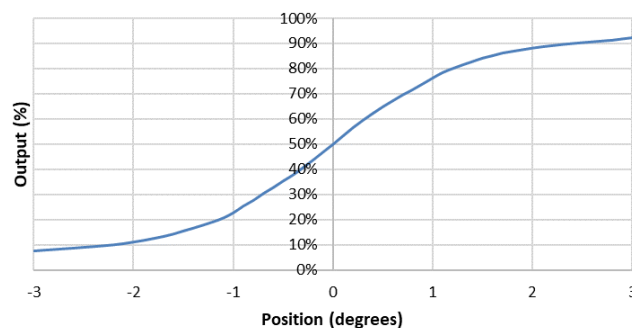
Applications

- [Geotechnical and structural monitoring](#)
- [Construction tools, laser leveling](#)
- Medical devices

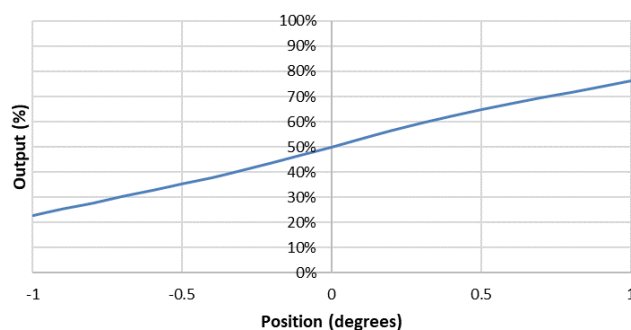
View the full list at www.frederickscompany.com/markets.

Operating and Linear Range Output Behavior

Operating Range Output % vs Position (°)



Operating Range Output % vs Position (°)



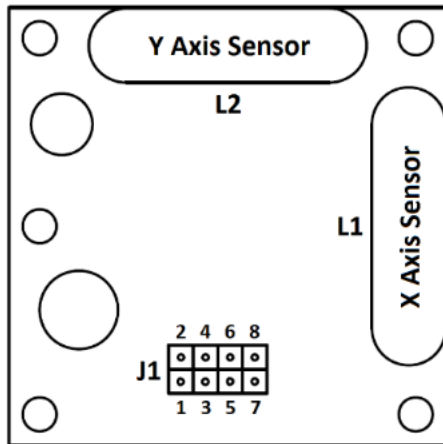


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Electrical Connections

Pin 1	Gnd	Ground
Pin 2	Gnd	Ground
Pin 3	Vcc	Supply Voltage (+)
Pin 4	Gnd	Ground
Pin 5	RX	RS-232 Receive
Pin 6	Xa	X Analog Output (0 to 5 V DC)
Pin 7	Ya	Y Analog Output (0 to 5 V DC)
Pin 8	TX	RS-232 Transmit



RS-232 Settings

Baud Rate	9600 (default, selectable up to 115200)
Data Bits	8
Parity	None
Stop Bits	1

RS-232 Commands (ASCII)

'x' or 'X'	X axis output (0 to 65535)
'y' or 'Y'	Y axis output (0 to 65535)
't' or 'T'	Temperature output (0 to 1023)
's' or 'S'	Output X, Y, temperature at set intervals
'r' or 'R'	Stop timed interval output
'1' to '5'	Set delay (in seconds) for set intervals
'v' or 'V'	Product information and version
'B1'	Set baud rate to 9600
'B2'	Set baud rate to 19200
'B3'	Set baud rate to 38400
'B4'	Set baud rate to 57600
'B5'	Set baud rate to 115200
'?'	List all commands

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:

$$\text{Temperature in } ^\circ\text{C} = (((\text{output}/1023)*5)-0.5)/0.01$$

Mounting Notes

The F203-00A-212-00 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.

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
Article	Structural Monitoring Case Study: Resensys

Certifications and Ratings

- RoHS compliant

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.

Contact Us

The Fredericks Company
2400 Philmont Avenue
Huntingdon Valley, PA 19006

www.frederickscompany.com
+1 215 947 2500

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