Analog/PWM Signal Conditioner for Electrolytic Tilt Sensors
Part Number: 1-6200-007

Operating Specifications	
Interface	Analog 0 to V_{dd} and PWM
Analog Input Resolution	16 bits (10 bits oversampled)
Operating Range	0% to 100% of sensor range
Supply Voltage	3.3 V DC to 5 V DC
Supply Current	15 mA @ 5 V DC, 10 mA @ 3.3 V DC
Operating Temperature	-40 °C to 85 °C
Storage Temperature	-40 °C to 125 °C
Sensors Controlled	1 or 2
Axes of Measurement	1 or 2
Temperature Sensor Range	-40 °C to 125 °C

Dimensions	
Housing	None
Electrical Connections	7 Pin, 2.54 mm (0.1”) spacing
Weight	4 g
Length	32 mm (1.25”)
Width	32 mm (1.25”)
Hole Center	27 mm (1.05”)

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

Benefits

- Very low power consumption
- Simple integration
- Excellent resolution and repeatability of measurements
- Superior performance in extreme temperatures and environments
- Excellent customer support

Description

The **1-6200-007** analog/PWM signal conditioner can be used with any Fredericks electrolytic tilt sensor. This signal conditioner can be connected to a dual axis tilt sensor or 1 or 2 single axis tilt sensors to provide single or dual axis position measurement over the sensor’s range.

Fredericks 0717 series wide range sensors can be mounted directly to the PCB for a complete inclinometer solution. Single axis sensors must be mounted externally to the PCB and connected with wires.

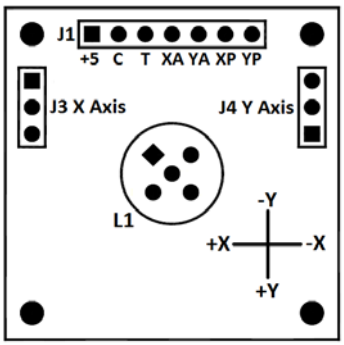
A detailed list of compatible sensors can be found on page 2 in the Related Products section.

Applications

- Recreational vehicle leveling (also known as an RV, caravan, camper van, or motorhome)
- Construction vehicles
- Geotechnical and structural monitoring
- Laser leveling
- Machine tool leveling
- Rail track monitoring
- Satellite positioning

View a full list of applications on The Fredericks Company website at www.frederickscompany.com.

Pin Diagram and Direction of Measurement



Note that the direction of measurement only applies when a dual axis sensor is mounted on the PCB.

Certifications and Ratings

- RoHS Compliant

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Converting Temperature Values

The board temperature is an analog output from 0 V DC to V_{dd} V DC. To convert that value to a temperature in °C, use the following equation:

Temperature in °C = ((output voltage/V_{dd})-0.5)/0.01

Related Products

Dual Axis Electrolytic Sensors - Metal	
0717-4318-99	±60˚ range, ±0.1˚ repeatability
0717-4319-99	±50˚ range, ±0.1˚ repeatability
0717-4313-99	±50˚ range, ±0.05˚ repeatability
0717-4315-99	±60˚ range, ±0.05˚ repeatability
Single Axis Electrolytic Sensors - Metal	
0703-0711-99	±3˚ range, ±0.001˚ repeatability
0703-1602-99	±25˚ range, ±0.005˚ repeatability
Single Axis Electrolytic Sensors - Glass	
0737-0101-99	±10˚ range, ±0.0006˚ repeatability
0737-1203-99	±0.5˚ range, ±0.0001˚ repeatability
0711-0763-99	±1˚ range, ±0.0008˚ repeatability
0711-0768-99	±3˚ range, ±0.0008˚ repeatability
Single Axis Electrolytic Sensors - Glass Encapsulated	
0719-3705-99	±10˚ range, ±0.0006˚ repeatability
0719-3703-99	±0.5˚ range, ±0.0001˚ repeatability
0719-1137-99	±1˚ range, ±0.0008˚ repeatability
0719-1143-99	±3˚ range, ±0.0008˚ repeatability

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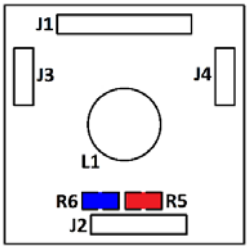
Board Configuration

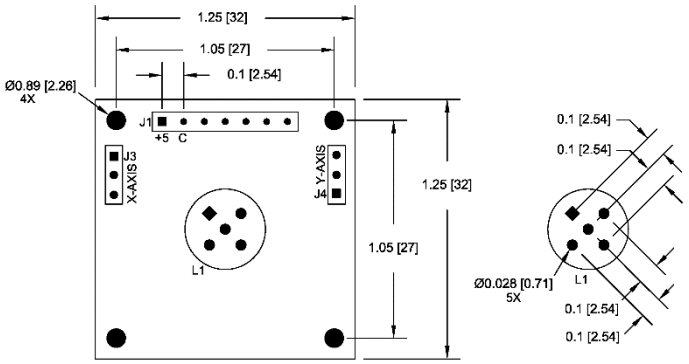
The 1-6200-007 signal conditioner can be configured to operate one dual axis sensor or two single axis sensors. Dual axis sensors can be mounted directly to the board, whereas single axis sensors must be mounted off the board and connected with wires.

The board must be configured for either dual axis sensors or single axis sensors. This configuration is is determined by the resistor values of R5 and R6.

1. For a dual axis sensor: R5 (red) is 10 kΩ, R6 (blue) is not installed (open circuit). The sensor is connected to L1.
2. For single axis sensors: R5 (red) is not installed (open circuit), R6 (blue) is 1 kΩ. Sensors are connected to J3 and J4.



Dimensional Drawings



Company Information

Tilt measurement products and sensors that set standards - Fredericks' comprehensive TrueTilt™ tilt sensor product portfolio offers electrolytic tilt sensors, inclinometers, and tilt switches. Patented and engineered to outperform competing technology, our tilt sensors are not just repeatable, but highly accurate with high resolution. Our tilt measurement products have no planned obsolescence and serve industries ranging from construction and RV leveling to aerospace and everything in between.

Specialty manufacturing services that promise precision - For more than 80 years, Fredericks has specialized exclusively in tilt measurement products. Today, our precise manufacturing processes produce the most accurate and advanced products on the market, ensuring perfection every time. A true specialty service provider, we are willing and eager to put our experience and capabilities to good use, helping OEMs achieve even the most complex designs.

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