



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

| | |
|-----------------------------|---|
| $V_{dd} = 3.3 \text{ V DC}$ | 0 V DC to 3.3 V DC, 0° tilt = 1.65 V DC |
| $V_{dd} = 5.0 \text{ V DC}$ | 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
- Manufactured in the United States of America

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.

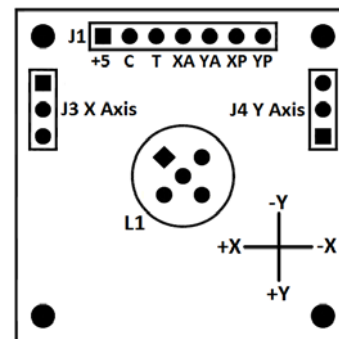
A detailed list of compatible sensors can be found on page 2 in the Related Products section.

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

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:

$$\text{Temperature in } ^\circ\text{C} = ((\text{output voltage}/V_{dd}) - 0.5) / 0.01$$



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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

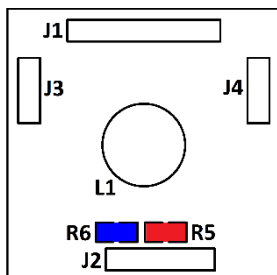
| | |
|--------------|-------------------------------------|
| 0719-3705-99 | ±10° range, ±0.0006° repeatability |
| 0719-3703-99 | ±0.5° range, ±0.0001° repeatability |
| 0719-1138-99 | ±1° range, ±0.0008° repeatability |
| 0719-1143-99 | ±3° range, ±0.0008° repeatability |

Board Configuration

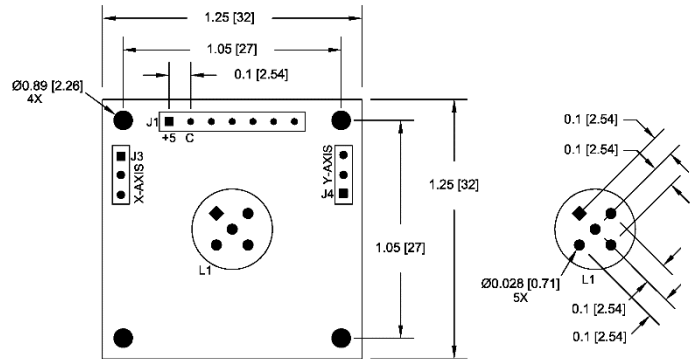
The 1-6200-007 signal conditioner can be configured to operate one dual axis sensor or two single axis sensors. Dual axis sensors can be mounted directly to the board, whereas single axis sensors must be mounted off the board and connected with wires.

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

- For a dual axis sensor: R5 (red) is 10 kΩ, R6 (blue) is not installed (open circuit). The sensor is connected to L1.
- 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.

High performance products designed and manufactured with pride in the USA - Fredericks is a global provider and U.S. manufacturer of high-performance tilt measurement products. Built to last, our products are made with state-of-the-art sensing technology, proven processes, and an intrinsic passion for the trade. Offering simple integration and quality and safety benchmarks, our customers benefit not just from standard-setting reliability, but from our commitment to competitive pricing and performance.

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