

Accelerometer (ACC) Sensor Data Sheet

ACC 080115

SPECIFICATIONS

- > **Range:** $\pm 3G$
- > **Bandwidth:** 0-50Hz
- > **Consumption:** $\sim 0.35mA$

FEATURES

- > 3-axis sensing
- > MEMS technology
- > Pre-conditioned analog output
- > Small form factor
- > Raw data output
- > Easy-to-use

APPLICATIONS

- > Activity monitoring
- > Tilt detection
- > Vibration measurement
- > Human-Computer Interaction
- > Robotics & Cybernetics
- > Biomechanics
- > Biomedical devices prototyping

GENERAL DESCRIPTION

Motion produces accelerations that can be translated into numerical values. Our Accelerometer (ACC) has a limited bandwidth, especially designed to acquire data from kinematic and biomechanical events. The analog output of each axis can be accessed individually, extending its potential use. Typical applications include posture detection, range of motion estimation, step counting, actigraphy, fall detection, vibration analysis, and shock detection. By default only the Z-axis is connected, however the sensor has 3 axis, and the user can choose to connect the X- and Y-axis as well, by following these steps:

<https://www.youtube.com/watch?v=RaJQ3hcdJqUh>

https://www.youtube.com/watch?v=rh8y_NsVLl4h

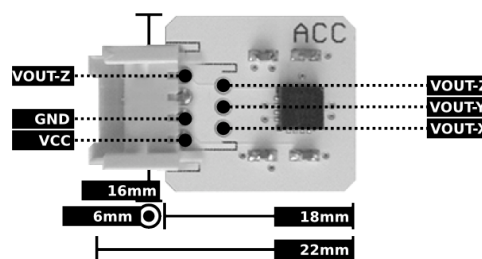


Fig. 1. Pin-out and physical dimensions.

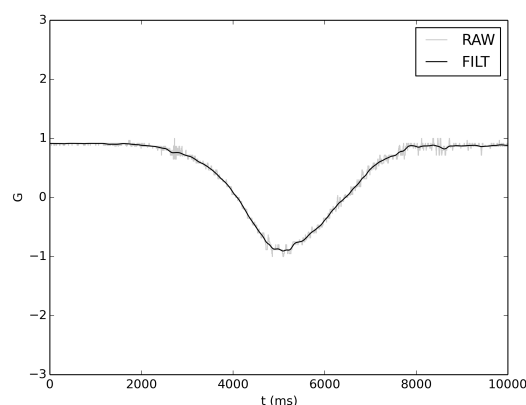


Fig. 2. Raw and filtered ACC data (acquired with BITalino) for a full rotation around the Z-axis.



REV A

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BEWARE: DIRECT OR INDIRECT COUPLING TO THE MAINS MAY RESULT IN SHOCKING HAZARD



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TRANSFER FUNCTION

[-3g, 3g]

$$ACC(g) = \frac{ADC - C_{min}}{C_{max} - C_{min}} \cdot 2 - 1$$

$ACC(g)$ – ACC value in g-force (g)

ADC – Value sampled from the channel

C_{min} – Minimum calibration value¹ (typically $C_{min} \approx 208$)

C_{max} – Maximum calibration value¹ (typically $C_{max} \approx 312$)

¹ Calibration values are determined by performing a very slow 360° rotation of the sensor board to force the accelerometer to cross the gravity-imposed $-1g$ and $1g$.