Electromyography (EMG) Sensor Data Sheet

EMG 15102015

SPECIFICATIONS

> **Gain:** 1000
> **Range:** ±1.5mV (with VCC = 3V)
> **Bandwidth:** 25-500Hz
> **Consumption:** ~1mA
> **Input Impedance:** >100GOhm
> **CMRR:** 100dB

FEATURES

> Bipolar differential measurement
> Pre-conditioned analog output
> High signal-to-noise ratio
> Shielded miniaturized cables
> Medical-grade raw data output
> Ready-to-use form factor

APPLICATIONS

> Life sciences studies
> Biomedical research
> Human-Computer Interaction
> Robotics & Cybernetics
> Physiology studies
> Psychophysiology
> Biomechanics
> Ergonomics

GENERAL DESCRIPTION

Muscle activation is triggered by bioelectrical signals of very low amplitude sent from motor control neurons on our brain to the muscle fibers. Electromyography (EMG) enables the translation of these electrical signals into numerical values, enabling them to be used in a wide array of applications. Our sensor is especially designed for high performance surface EMG data acquisition even in the most extreme conditions. The bipolar configuration is ideal for uncompromised low-noise data acquisition, and the raw data output provides medical-grade data enabling it to be used for advanced and highly accurate biomedical research. Examples:

http://bit.ly/1zJObmk
http://bit.ly/1tOZbvY
http://arxiv.org/pdf/1402.1296.pdf
http://bit.ly/1OS5Aeth
http://bit.ly/18ELQ01

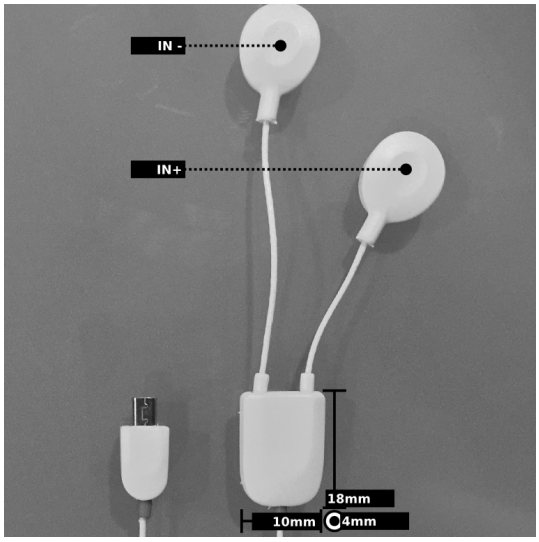

Fig. 1. Integrated miniaturized sensor + cable assembly providing unrivalled headache-free use.

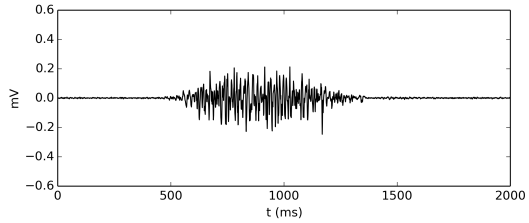

Fig. 2. Typical raw EMG data (acquired with biosignals).

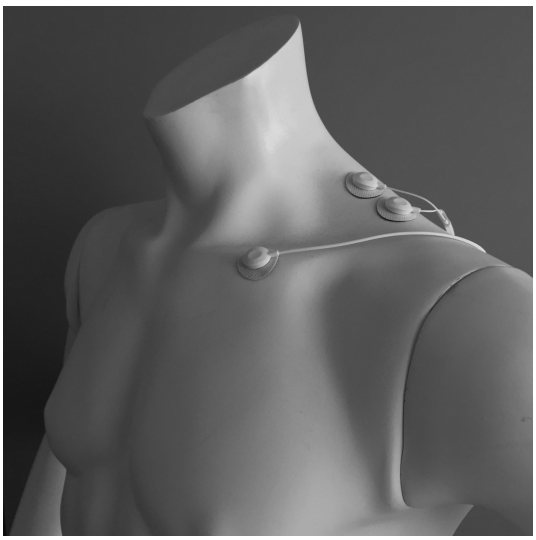

Fig. 3. Example electrode placement, with REF in a bone region (electrically neutral), and IN+ & IN- 20mm apart over the muscle belly (aligned with the muscle fibers).

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REV A

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TRANSFER FUNCTION

[-1.5mV, 1.5mV]

$$EMG(V) = \frac{\left(\frac{ADC}{2^n} - \frac{1}{2}\right).VCC}{G_{EMG}}$$

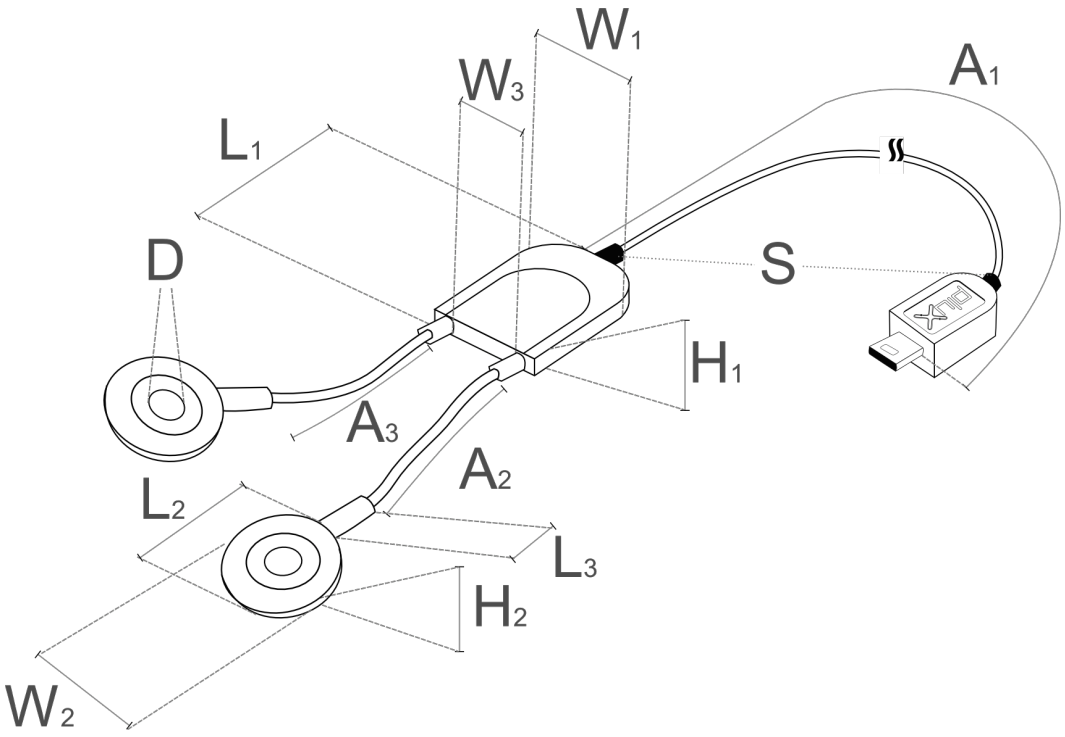
$$EMG(mV) = EMG(V).1000$$

$VCC = 3V$ (operating voltage)
$G_{EMG} = 1000$ (sensor gain)

$EMG(V)$ – EMG value in Volt (V)
$EMG(mV)$ – EMG value in millivolt (mV)
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

PHYSICAL CHARACTERISTICS

> **W1 x L1 x H1:** 1.0x1.8x0.4cm
> **W2 x L2 x H2:** 1.5x2.3x0.4cm
> **A1:** 105.0±0.5cm
> **A2:** 5.0±0.5cm
> **A3:** 2.5±0.5cm
> **D:** 0.4cm
> **S:** White, Black, Blue, Green, Red, Yellow, Gray, or Brown



[1] The number of bits for each channel depends on the resolution of the Analog-to-Digital Converter (ADC); in biosignalsplux the default is 16-bit resolution ($n = 16$), although 12-bit ($n = 12$) and 8-bit ($n = 8$) may also be found.

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ORDERING GUIDE

Reference	Package Description
EMG1	Electromyography (EMG) sensor with standard physical characteristics and a random cable sleeve color
EMG1-A1-A2-A3-S	Electromyography (EMG) sensor built with custom lengths A1, A2 and/or A3 (all in cm), and custom sleeve color S; for standard physical characteristics in A1, A2, A3, or S use 0. Examples: > EMG1-200-0-0-0: Otherwise all-standard EMG sensor except for a 200cm cable A1 > EMG1-0-0-0-Yellow: Otherwise all-standard EMG sensor except for a yellow cable sleeve > EMG1-50-10-10-Red: Fully custom EMG sensor with a 50cm cable A1, 10cm electrode cables A2 & A3, and a red cable sleeve