Goniometer (ANG)
Sensor Data Sheet

SPECIFICATIONS
> Axis: 2
> Range: ±150°
> Accuracy: ±2°
> Repeatability: ~1°
> Lifetime: 600.000 cycles

FEATURES
> Twin axis
> Strain gauge technology
> Flexible beam (total freedom of motion)
> Independent analog outputs
> Pre-conditioned analog output
> High signal-to-noise ratio
> Shielded miniaturized cables

APPLICATIONS
> Range of motion analysis
> Flexion / extension measurements
> Ulnar / radial deviation measurement
> Biomechanics
> Kinematics
> Ergonomics
> Gait analysis
> Human-Computer Interaction
> Robotics & Cybernetics

GENERAL DESCRIPTION

This twin-axis goniometer provides accurate data related with flexion/extension and ulnear/radial deviation. With two attachment points to the body and a flexible beam it enables high-performance uncompromised operation even in dynamic scenarios, without limiting the motion of the monitored subjects. Each axis is made available as an independent analog output, providing maximum flexibility. Multiple size options are available, enabling placement in segments ranging from a finger (e.g. intermediate – proximal phalanges) to a leg (e.g. lower part of the femur – upper part of the tibia).
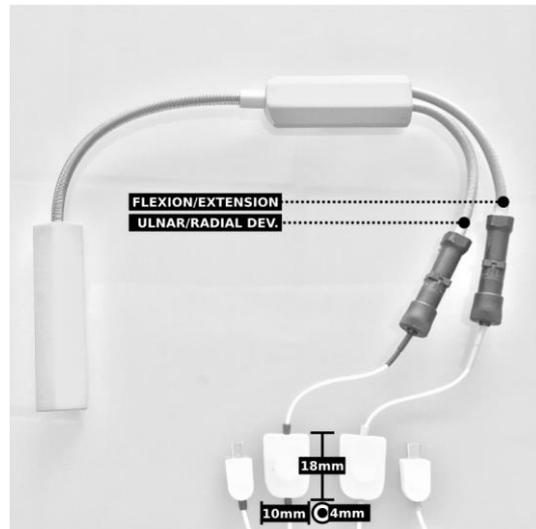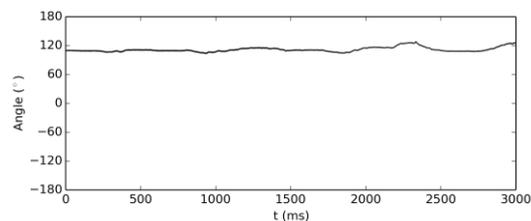

Fig. 1. Twin-axis, flexible beam goniometer.
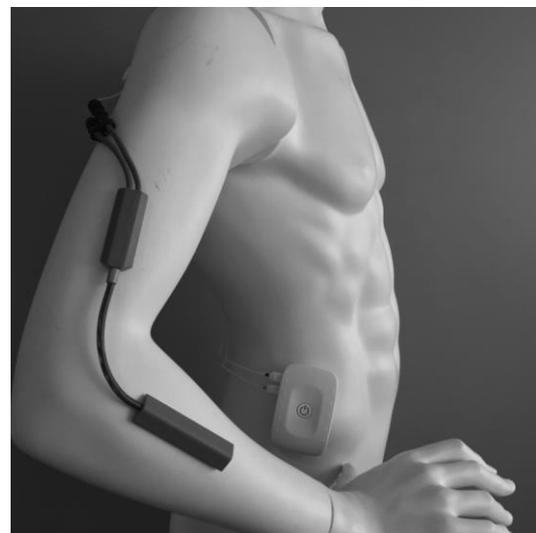

Fig. 2. Sample raw ANG data (acquired with biosignals).

Fig. 3. Example use on the humerus – radius segment.

TRANSFER FUNCTION

REV A

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[-150°, 150°]

$$ANG(°) = \frac{\left(\frac{VCC}{2^n - 1}\right) \times ADC - \frac{VCC}{2}}{\frac{VCC}{2} \times 606 \times 10^{-5}}$$
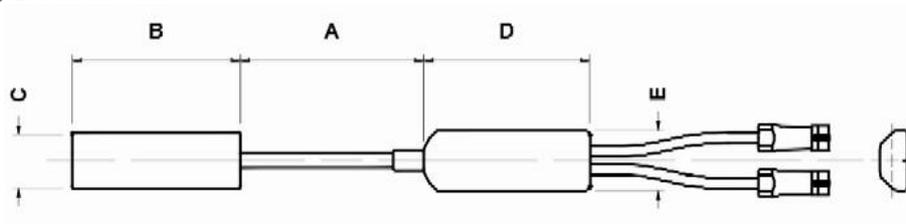
$ANG(°)$ - Angle value in degrees (°)
ADC – Value sampled from the channel
VCC – Operating voltage (3V)
n – Number of bits of the channel[1]

PHYSICAL CHARACTERISTICS
> A: 3.0 – 11.5 cm
> B: 1.8 – 12.0 cm
> C: 0.8 or 1.8 cm
> D: 1.5 – 5.4 cm
> E: 0.8, 2.0 or 5.4 cm

ORDERING GUIDE

Reference	Package Description
GON1	Goniometer (GON) sensor in a standard configuration (Fig. 1 & 3) with A=7.0, B=6.0, C=1.8, D=5.4, and E=2.0 (units in cm).
GON1-A1-A-B-C-D-E-S	Goniometer (GON) sensor built with custom configuration of the physical elements (A, B, and D are subject to closest pre-defined configuration).

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[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.