Inductive Respiration (RIP)
Sensor Data Sheet

RIP 27042015

SPECIFICATIONS
> **Bandwidth:** 0.075-1Hz
> **Operating Humidity:** 5-95% (non-condensing)
> **Operating Temperature:** 5-40ºC

FEATURES
> Inductive sensing technology
> Adjustable elastic chest strap
> High sensitivity
> High signal-to-noise ratio
> Pre-conditioned analog output

RESEARCH APPLICATIONS
> Thoracic or abdominal respiration analysis
> Respiratory cycles measurement
> Sleep studies
> Biomedical research
> Biofeedback
> Psychophysiology

GENERAL DESCRIPTION
This high-performance inductive respiration sensor has been specifically designed having dynamic conditions in mind (e.g. effort trials, ambulatory sensing, etc.). The sensing element is embedded in the chest strap fabric, and spans its full length. Unlike our affordable piezoelectric (PZT) sensor (which only measures the displacement in a localized manner), the RIP option measures the overall displacement of the thorax or abdomen, making it more immune to motion-induced artifacts. The elastic strap is can be adjusted in length, enabling the sensor to be applied in different anatomies (e.g. male and/or female) and body locations (e.g. thorax and/or abdomen). Typical applications include monitoring of respiratory rate, respiratory cycle regularity, relative amplitude of the cycle, and others. When multiple sensors are used simultaneously it enables diaphragmatic versus thoracic breathing assessment (e.g. for biofeedback).
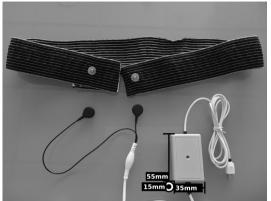

Fig. 1. The sensor element is placed along the full length of the chest strap for unrivalled performance.
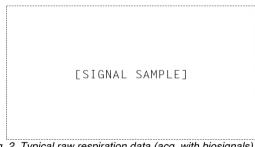

Fig. 2. Typical raw respiration data (acq. with biosignals).

Fig. 3. Example of respiration sensor used on the chest.

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Piezoelectric Respiration (PZT)
Sensor Data Sheet

TRANSFER FUNCTION

[-50%, 50%]

$$RIP(\%) = \left(\frac{ADC}{2^n} - \frac{1}{2}\right).100\%$$

$RIP(\%)$ – Displacement value in percentage (%) of full scale
ADC – Value sampled from the channel
n – Number of bits of the channel[1]

ORDERING GUIDE

Reference	Package Description
RIP1	Inductive respiration (RIP) sensor in a standard configuration.
RIP1-A-S	Inductive respiration (RIP) sensor built with custom cable length A and custom sleeve color S; for standard physical characteristics in A or S use 0. Examples: > RIP1-200-0: RIP sensor with a 200cm cable A and random sleeve color > RIP1-0-Yellow: RIP sensor with a standard cable size A and a yellow cable sleeve > RIP1-50-Red: Fully custom RIP sensor with a 50cm cable A and a red cable sleeve

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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.