

Wireless Sensor Kit overview

The stretch sensor kit enables you to quickly get hands on with our stretch sensors. The kit can be used for unobtrusive monitoring of soft structures such as the human, textiles, and other flexible structures. It is ideal for prototyping wearable motion capture or for characterising the sensors with a view to product integration.

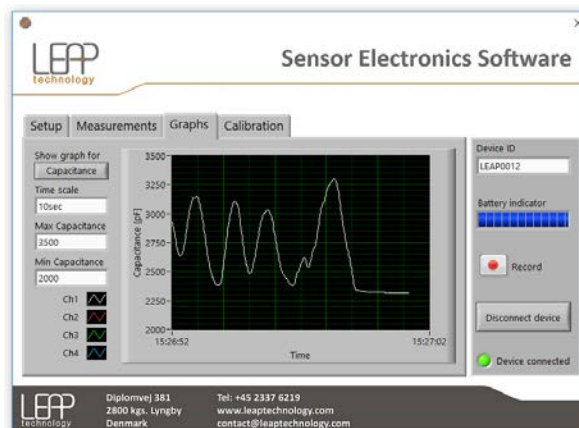
Contents

The stretch sensor kit includes:

- Two stretch sensors (see datasheet),
- One wireless measurement electronics measuring up to 4 sensors simultaneously (see datasheet),
- Charging wires,
- USB drive containing graphical user interface software.



Graphical user interface



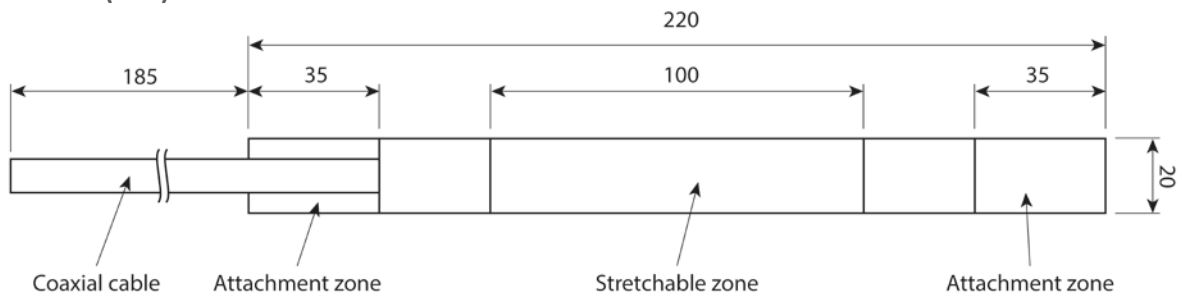
Elastomer stretch sensor (04D0010)

Made from high quality elastomer materials, the LEAP Technology stretch sensor is a versatile, **highly elastic capacitive strain gauge**.

- Highly stretchable sensor enables unobtrusive motion capture of human, machines, and complex surfaces;
- Capacitive sensing characteristic ensures accurate and repeatable measurements;
- Easy textile integration due to its low profile and textile based cabling;
- Inherently tolerant to shock, vibration and misalignment;
- Minimum response to applied surface pressure;
- Washable.



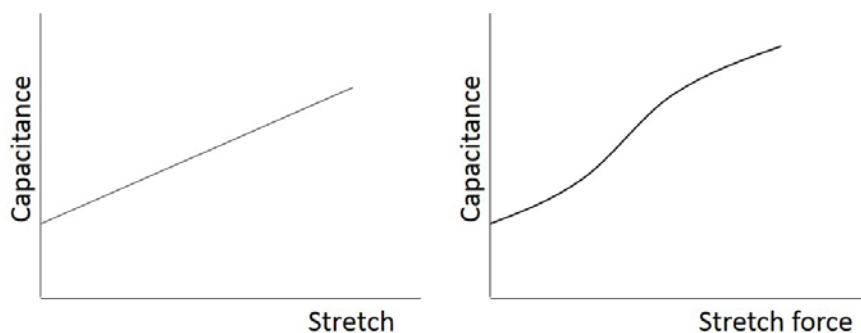
Dimensions (mm)



Note: Stretchable zone thickness: 0.4mm

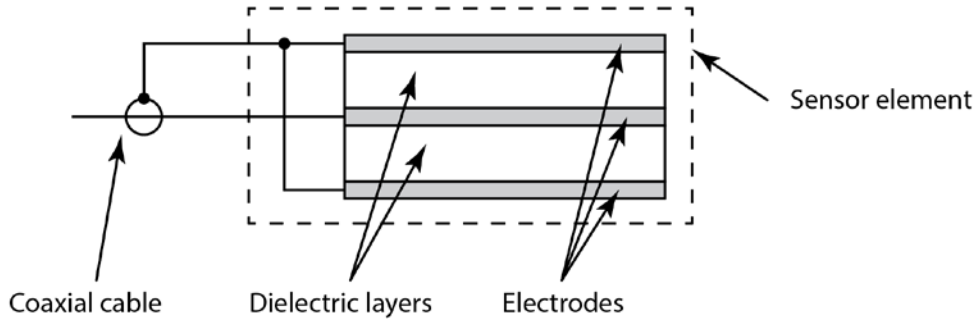
Working principle

The sensor's capacitance change to stretch or displacement is highly linear and repeatable. The response to applied force is non-linear, though highly repeatable, owing to the non-linear modulus of the materials used in the construction of the sensor.



Internal construction

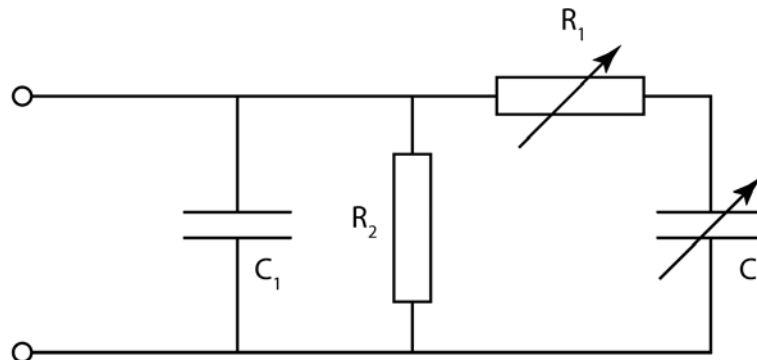
The sensor is constructed with three electrodes, the outer two of which are connected to the screen of the coaxial cable. This is to allow electronics to measure the capacitance in such a way that minimises capacitive coupling to other objects. This is especially useful in wearable devices.



Specifications

Parameter	Value	unit
Maximum stretch	80	mm
Capacitance at rest* ($C_{2min} + C_1$)	1	nF
Capacitance at full stretch* ($C_{2max} + C_1$)	5	nF
Series resistance – fluctuating (R_1)	10 to 100	$k\Omega$
Parallel resistance (R_2)	<1	$G\Omega$
Load at maximum stretch*	6	N
Weight*	6	grams

***Indicative figures.** These sensors are highly customisable in shape, size, stretch, sensitivity, connections and encapsulation type. Please contact us for custom versions and specific product development and testing needs.



Equivalent electric circuit

Measuring the capacitance

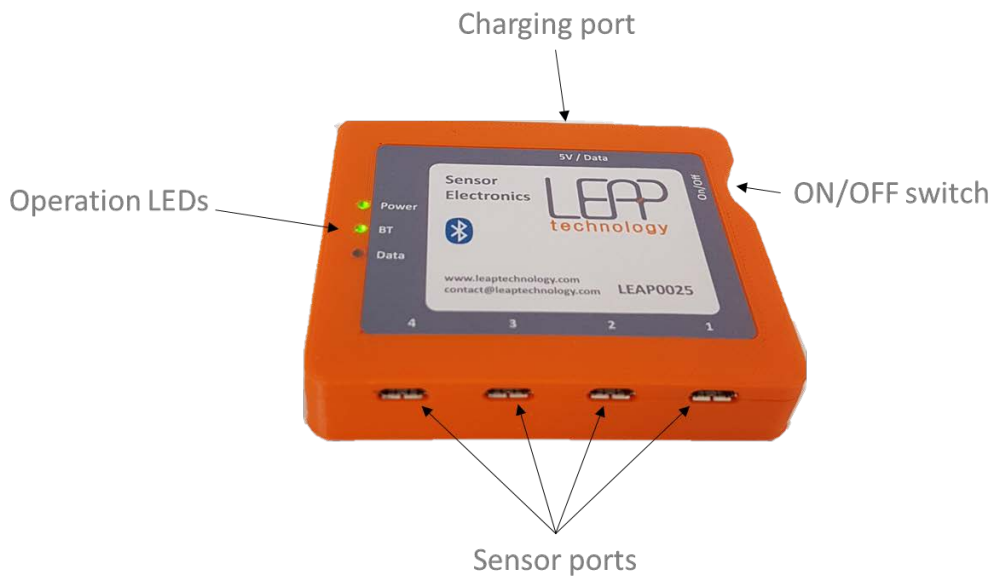
It is recommended to use a constant current charging circuit to measure the capacitance in such a way that makes the measurement insensitive to the fluctuating value of R_1 . LEAP Technology supply such electronics for measuring the capacitance and converting it into the units of choice. Please contact us to learn more.

www.leaptechnnology.com
 contact@leaptechnology.com
 LEAP Technology ApS • Diplomvej 381 • 2800 Kgs. Lyngby • Denmark

Wireless sensor electronics

This easy to use electronics box is designed for capacitive sensor measurements. The included circuit and software is capable of measuring capacitors with variable capacitance as well as variable equivalent serial resistance (ESR), thus making it ideal for electroactive polymer (EAP) sensor measurements. Due to its universal measurement technique, this device can measure EAP sensors of LEAP Technology as well as those from third parties. The circuit is supplied with proprietary PC software that enables you to measure, save, and display real-time data. An API is available upon request. The board can measure up to four sensors and is equipped with Bluetooth and cable connections for transferring data.

Inputs and outputs



Technical specifications

Item	Value	Description
Power supply	5V	
EAP sensor ports	Up to 4	Software selectable. Can be upgraded to 8 sensor ports.
Communication platform	Bluetooth and USB	Software selectable
Measurement range	0.1 – 10nF	Software selectable
Excitation frequency	100 – 800Hz	Software selectable
Digital update rate	0.1 – 800Hz	Software selectable
Averaging number	n = 1 – 100	Software selectable
Resolution	1pF	
Maximum Series resistance	100 kOhm	
Operation temperature	10 – 60°C	