

INTRODUCTION

The R-series sensor is a fully shielded, low mass, thin, ribbon sensor. It consists of a sensing element constructed of elastic electret Emfit film, 3 layers of polyester film with aluminium electrodes (Fig.1 and Fig. 2). Crimped connectors are used for connecting to electrodes. Options available are a shielded cable soldered to connectors with temperature pressed and melt protection cover over the joint (Fig. 3) with/without FET preamp stage integrated into joint. A 90 microns acrylic adhesive available is also optionally available on one or both sides of the element.

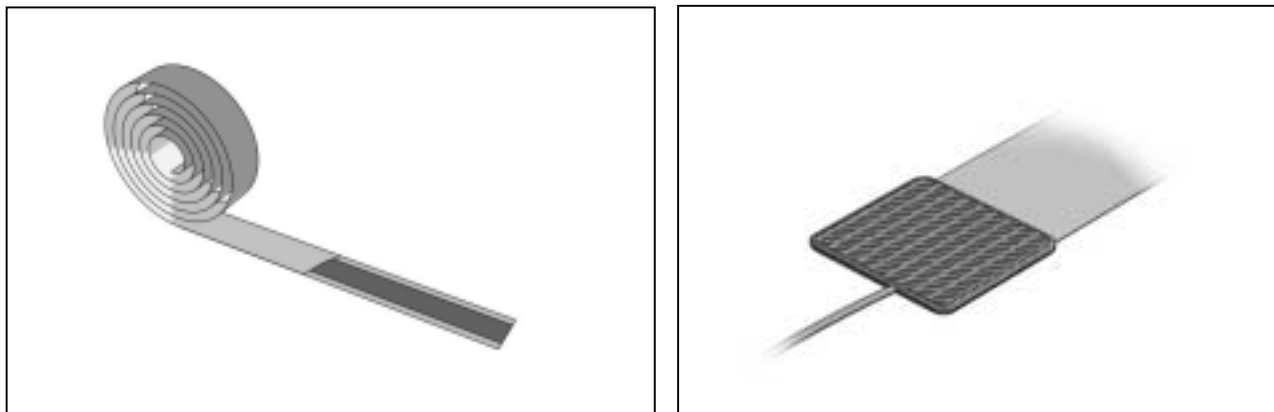
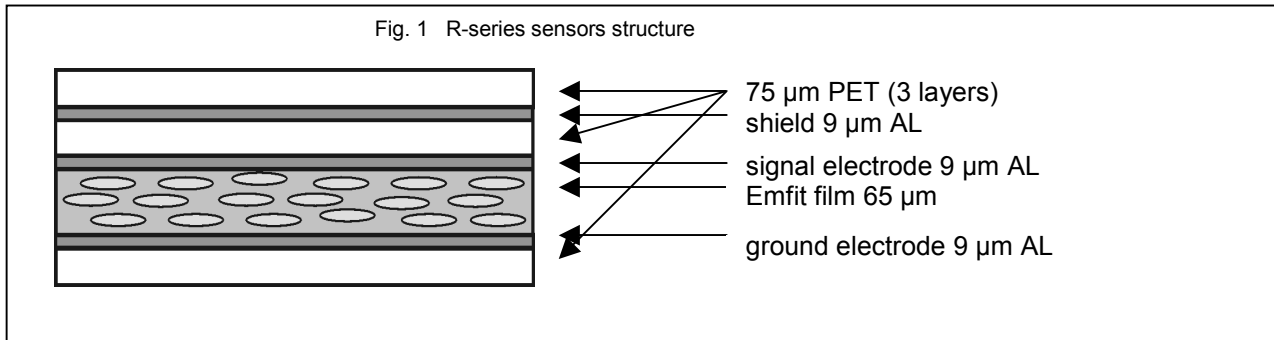


Fig. 2

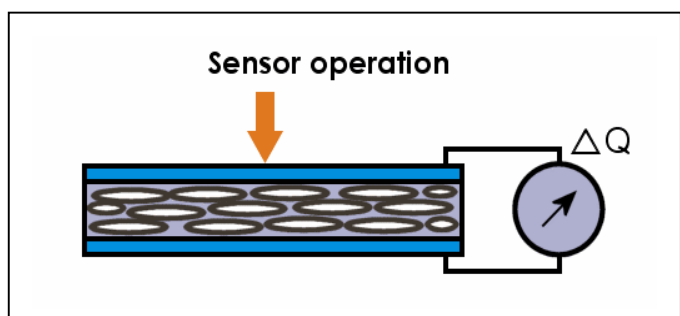
Manufactured in a reel-to-reel process, sensors are available in widths of 25 mm and 40 mm. Roll lengths are 6 m. Can be cut to shorter sensors.

USES

Switches, security, vehicle counting, weight-in-motion, patient bed monitoring, machine monitoring, acoustic emission detection, contact microphone, vibration/impact sensing, acoustic pickup, pyrometer, seismic geophone, hydrophone...

SENSOR OPERATION

Operating in a reciprocal fashion, changes in the thickness of the Emfit sensor generate a corresponding charge and hence, voltage to appear on the electrodes. The transducer behaves like an "active" capacitor, consequently, loading of the signal by the input impedance of the measuring device must be considered.



Due to the thinness of the films, the associated capacitance can be sufficient to give adequate low frequency response into standard 1 M Ω loads, but the use of an X10 probe will extend the low frequency range by a decade. For extremely low force change levels, some buffering may be desirable. For the majority of analysis work, this is unnecessary and the film can feed directly to the instrument. Again, the low mass contributed by the transducer is of major importance, and its non-resonate behaviour. Frequency response is inherently flat to over 20 KHz with only the R-C roll off at low frequencies distorting the profile.

Though it is responding to thickness change rather than strain, low signal levels may be generated by low frequency flexing, so a distinction must be made between the frequency response of the film for changes in its primary parameter (i.e., thickness) and its relative behaviour compared with, say piezoelectric sensors. The sensor has a flat response over a very wide frequency range, with resonant frequency points well above 20 KHz.

OTHER SPECIFICATIONS

Property	Symbol	Value	Unit	Tolerance	Conditions
Storage temperature	Ts	from -40 to +50	°C		
Operating temperature ¹	Tr	from -20 to +50	°C		
Thickness	D	0,4	mm	±5 %	
Sensitivity ²	Sq	25	pC/N	±20 %	normal force
Relative permittivity	er	1,1		±10 %	@ 10 kHz
Capacitance	C	22	pF/cm ²	±5 %	@ 1–150 kHz, EQV 1
Tensile strength at break, TD		535	N	±10 %	ISO-527-1
Elongation at break, TD		20	%	±20 %	
Youngs modulus, TD		0,5	Mpa	±50 %	
Operating force range	P	N/cm ²	>100		
Standard widths	W	mm	25 / 40	±5 %	
Standard lengths ³	L	m	6	±1 %	

- 1) Loss of sensitivity is < 20 % after the following temperature cycles:
 - a) 11 hours at -20 °C, 1 hour at +20 °C, 11 hours at +70 °C, 1 hour at +20 °C, 28 cycles;
 - b) 1 hour at -20 °C, 1 hour at +70 °C, 10 cycles.
- 2) Sensitivity depends on pre-aging and number of Emfit layers. Max sensitivity available is up to about 400 pC/N upon special order.
- 3) Can be cut to shorter sensors.

ADDITIONAL INFORMATION

For additional information or assistance, please contact:

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