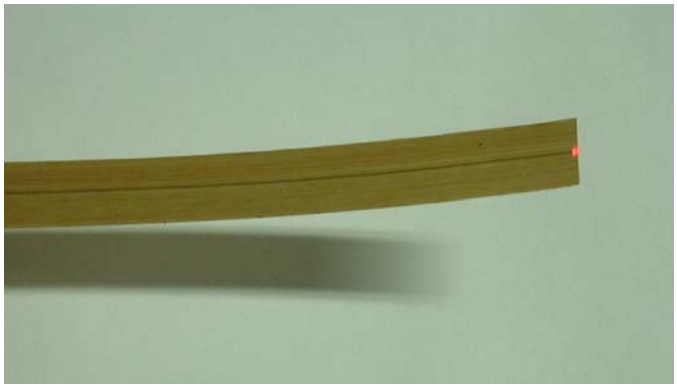
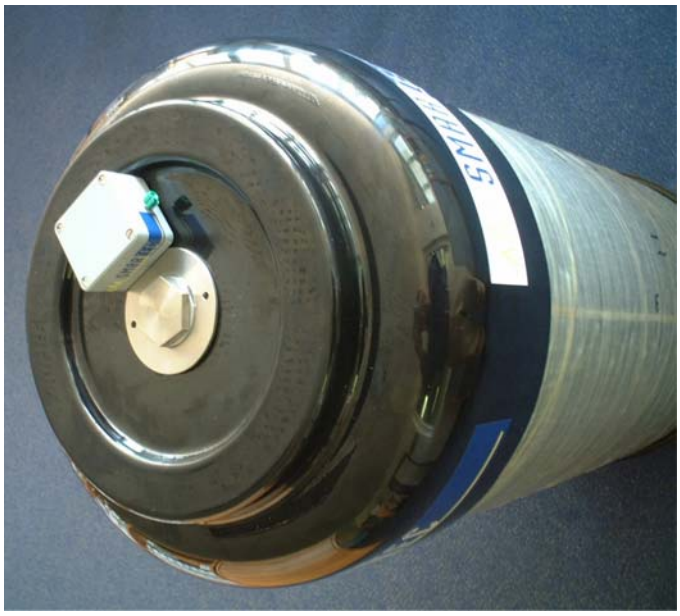


SOFO® SMARTape Deformation Sensor

- High resolution
- Extremely small sensor cross-section
- Insensitive to temperature variations
- Insensitive to corrosion, vibrations and EM fields
- Immune to electromagnetic fields
- No calibration required
- Embeddable between composite layers
- Applicable on traditional construction materials
- Extended temperature range
- Long lifetime



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SDS 10.13 (2006/04)

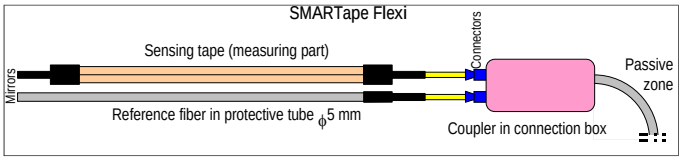
Data Sheet

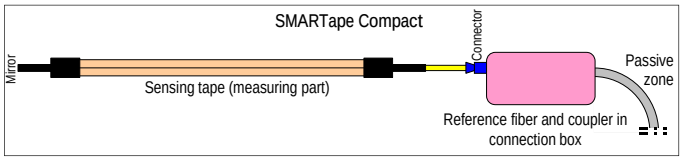
Description

The SMARTape deformation sensors are transducers that transform a strain variation into a change in the path unbalance between two optical fibers that can be measured with the SOFO® Reading Unit. The measuring part of the SMARTape is a sensing tape containing a composite tape with an embedded optical fiber. Extremely small cross-section (width of 6 to 13 mm and thickness of 0.2 to 0.4 mm) and high bending flexibility make it ideal for the application where the sensor dimension or the shape are critical (embedding between composite layers, curved forms of monitored structure, etc.). SMARTape sensors are robust and easy to handle. The sensing tapes can be wound on vessels, embedded in composite materials, or simply bonded or clamped to any kind of surface such as concrete, steel, composite, wood etc.

The SMARTape sensor is composed of an active and a passive zone. The active zone contains the composite sensing tape and the reference fiber for temperature compensations. The passive zone contains a coupler and the connecting cable that guides the optical signal from the reading unit to the sensor and back. Standard E-2000 connectors with a built in protective cover are used to assemble the components and connect the sensor with the reading unit. Details on the passive zone of the sensor can be found on the "SOFO® Sensors Connection Cables" datasheet.

The sensing tape can be differently combined with the reference fiber and the coupler, depending on the application. Thus, two types of sensing tapes are distinguished: SMARTape Flexi and SMARTape Compact. The schemas of their components and specifications for each sensing tape are given in figures and table below.





Technical characteristics

	SMARTape Flexi	SMARTape Compact
Sensing tape dimensions	w= 6 mm, t=0.2 to 0.4 mm	w= 6 mm, t=0.2 to 0.4 mm
Reference fiber	In flexible plastic tube ϕ5 mm	In aluminium box 140x70x30 mm
Coupler	In aluminium box 140x70x30 mm	In aluminium box 140x70x30 mm
Length of sensing tape	100 mm to 2 m	100 mm to 10 m
Conditions of use	Surface mounting in cases where the temperature is significantly variable along the sensing tape	Embedding or surface mounting in cases where temperature is relatively constant along the tape and approximately equal to the temperature of the aluminium box containing coupler and reference fiber
Measurement range	1.5 % in shortening	1.5 % in shortening
Resolution / accuracy	1.5 % in elongation	1.5 % in elongation
Operating temperature		
⇒ Sensing tape (excl. mirrors & pigtail)	-55°C to +200°C	-55°C to +200°C
⇒ Other components	-40°C to +80°C	-40°C to +80°C
Temperature compensation	Self - compensated	Self - compensated
Calibration	Not required	Not required

All information contained herein is believed to be accurate and is subject to changes without notice