SOFO® SMARTprofile Deformation Sensor

- High resolution
- Insensitive to temperature variations
- Insensitive to corrosion, vibrations and EM fields
- No calibration required
- Ideal for harsh on-site conditions
- Suitable for extreme pressure conditions
- Extended temperature range
- High chemical resistance
- Applicable in deep water
- Long lifetime

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Preliminary Data Sheet

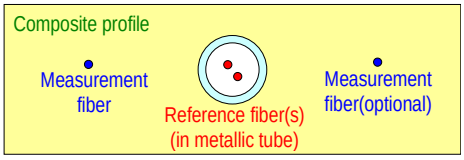
Description

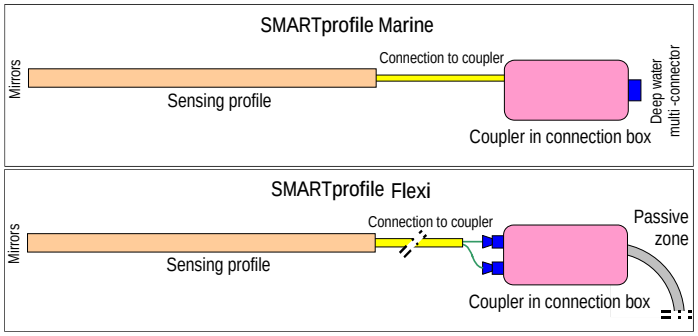
The SMARTprofile deformation sensors are transducers that transform a strain variation into a change in the path unbalance between two optical fibers that can be measured with the SOFO® Reading Unit. The SMARTprofile consists of a reinforced composite profile inside which both measurement fiber(s) and metallic micro-tube containing the reference fiber(s) are embedded. Small cross-section (width ~8mm; thickness ~3 mm) and composite packaging properties make it ideal for its application in harsh on-site conditions. It features high mechanical, chemical and temperature resistance. Therefore, it can be effectively used in sub-sea applications, oil and gas industry, industrial and military structures etc. The SMARTprofile can be simply bonded or clamped to any kind of surface such as steel, composite, concrete etc.

The SMARTape sensor is composed of an active and a passive zone. The active zone contains the composite sensing profile with embedded one or two measurement fibers (in case redundancy is required). The metallic tube containing reference fiber(s) for temperature compensation is also embedded in the profile. The active zone serves as a measurement basis of the sensor. The passive zone contains the connection to coupler, the 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 connect the sensor with the reading unit.

The sensing profile can be differently combined with the reference fiber and coupler, depending on the application. Thus, two main types of SMARTprofile are distinguished: SMARTprofile Marine and SMARTprofile Flexi. The schemas of their components and specifications are given in figures and table.

Sensing profile cross-section





Technical characteristics

	SMARTprofile Marine	SMARTprofile Flexi
Sensing profile dimensions	w= 7.8 mm, t=2.9 mm	w= 7.8 mm, t=2.9 mm
Connection to coupler	In flexible stainless steel tube, ϕ1.32 mm, L<1 m	In flexible stainless steel cable, ϕ2.2 mm, L<10 m
Coupler	In cylindrical connection box ϕ85 mm, L=390 mm	In rectangular connection box, min. 140x70x30 mm
Length of sensing tape	100 mm to 2 m	100 mm to 2 m
Conditions of use	Exposed to extreme hydrostatic pressure, but not to extreme temperature (e.g. under deep sea water); connection to coupler require additional protection	Exposed to extreme temperature, but not to extreme pressure (e.g. on the hot flowlines); connection box is to be installed in the area that is out of extreme temperature influence
Number of measurement fibers	1 or 2	1 or 2
Number of reference fibers	1 or 2	1 or 2
Measurement range	1.5 % in shortening, 1.5 % in elongation	1.5 % in shortening, 1.5 % in elongation
Resolution / Accuracy	2 μm (0.002 mm/m) / <0.2%	10 μm (0.010 mm/m) / <0.2%
Operating temperature		
Sensing profile	-55°C to +300°C	-55°C to +300°C
Connection box	-40°C to +80°C	-40°C to +80°C
Operating hydrostatic pressure		
Sensing profile	0 to 30 MPa (0 to 300 bar)	0 to 30 MPa (0 to 300 bar)
Connection box	0 to 30 MPa (0 to 300 bar)	No immersion allowed (IP65)
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