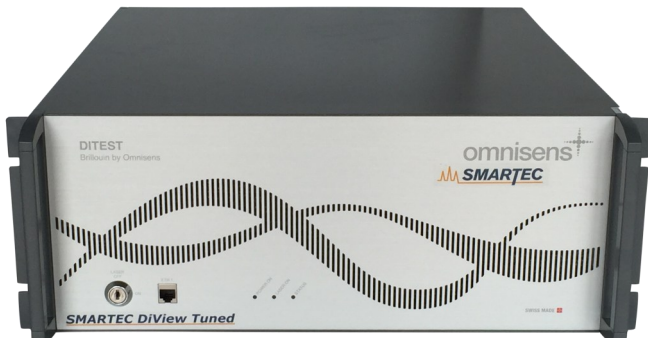




SINGLE- ENDED (BOTDR) AND LOOP (BOTDA) CAPABILITIES IN ONE BOX

HIGH ACCURACY AND LONG RANGE DISTRIBUTED STRAIN AND TEMPERATURE SENSING SYSTEM

COMPATIBLE WITH ALL DITEST STRAIN AND TEMPERATURE SENSING CABLES

DIVIEW II GRAPHICAL USER INTERFACE TUNED

Reliable and optimized performance Brillouin Interrogator (BOTDA/BOTDR) for field applications. Measure full strain and temperature profile over fiber optic sensing cables.

Description

The DiTeSt is a unique tool for the evaluation of distributed strain and/or temperature over several tens of kilometers. It is a powerful diagnostic instrument for the identification and localization of potential problems. It allows the monitoring of local strain and temperature at thousands locations by mean of a single optical fiber and in just one measurement. Its inherent high stability and self-referenced principle of operation allows on -line or off-line long-term monitoring of large structures.

Distributed fiber optic sensing provides measurement every meter along the entire sensing cable; this is particularly important in such cases where the location of defects cannot be predicted, and localized instrumentation is therefore useless.

The DiTeSt is a laser-based measurement system using an optical scattering measurement principle within the sensing fiber: Stimulated Brillouin Scattering. It can operate using dedicated fibers and cables as sensing element. Stimulated Brillouin Scattering is an intrinsic physical property of the fiber material and provides information about the strain and temperature distribution actually experienced by the sensing fiber.

The DiTeSt-DUAL provides 4 channels with fast and accurate strain and temperature measurements up to 80 km in BOTDA mode and up to 45 km with single-end mirror-less measurement.

Multiple fibers can be automatically connected to the instrument through an integrated optical switch. The system includes an industrial PC and internal hard-disk storage, allowing great versatility in terms of connections. The integrated software is user-friendly and allows an easy setup of the parameter through the use of self-configuration wizards. The system can operate interactively or in automatic mode, gathering data according to a schedule.

Compatible with SMARTEC DiView software for automatic data management and visualization.

Key Features

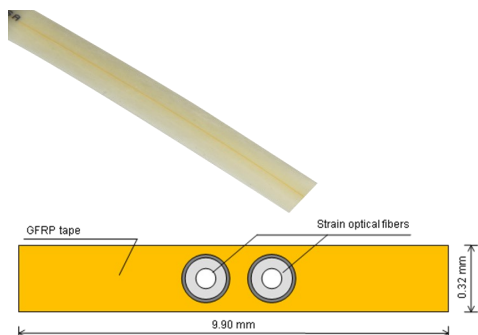
- High spatial resolution over the entire sensing distance
- Single-ended or loop configuration
- Extended range, up to 80km
- Long term stability
- Automatic monitoring
- Transportable
- Easy configuration

Applications

- Detection and localization of:
 - Strains distribution evolution
 - Onset of settlements
 - Subsurface damages
 - Abnormal joint movements
- Monitoring during construction:
 - Concrete slabs
 - Geotechnical piles
 - Diaphragm walls
 - Surrounding structures
- Safety operation / Life extension of critical assets:
 - Bridges
 - Buildings
 - Dams, Dikes
 - Geotechnical
 - Nuclear Power Plants
 - Tunnels, Penstocks
 - Underground mines, Tailing Storage Facilities

COMPATIBLE WITH FOLLOWING SENSING CABLES

DiTeSt SMARTape II



SMF => Singlemode 9/125

MMF => Multimode 50/125

Monitoring fibers: 2 SMF => Strain (BOTDR)

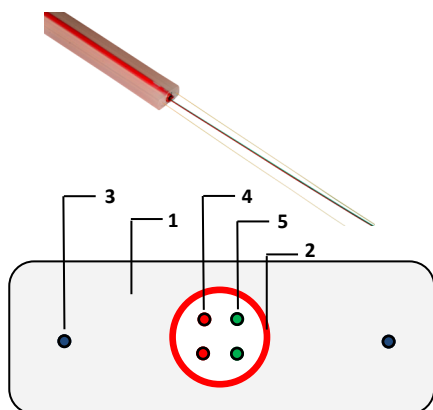
Deformation range: $\pm 1\%$

Temperature range: -40°C to $+120^{\circ}\text{C}$

Dimensions: 9.9mm x 0.3mm

Installation: Gluing

DiTeSt / DiTemp SMARTProfile II



1. LDPE matrix
2. PVC loose tube
3. 2x SMF (Strain)
4. 2x SMF
5. 2x MMF

Monitoring fibers: 2 SMF => Strain (BOTDR)
2 SMF => Loop back fiber
2 MMF => Temperature⁽¹⁾
⁽¹⁾ with DiTemp DTS Raman Interrogator

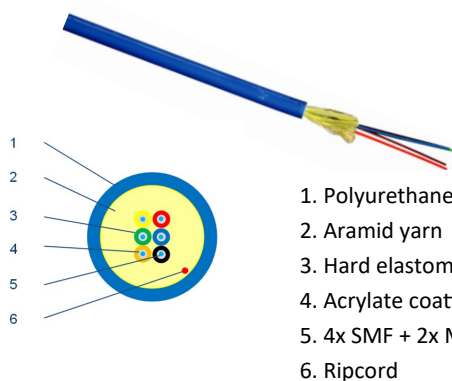
Deformation range: $\pm 1.5\%$

Temperature range: -40°C to $+60^{\circ}\text{C}$

Dimensions: 8.0mm x 4.0mm

Installation: Gluing, Clamping, or Embedding
(concrete, U-groove, trench)

DiTeSt / DiTemp HYDRO & GEO



1. Polyurethane outer jacket
2. Aramid yarn
3. Hard elastometric buffer
4. Acrylate coating
5. 4x SMF + 2x MMF
6. Ripcord

Monitoring fibers: 4 SMF => Strain (BOTDR)
2 MMF => Temperature⁽¹⁾
⁽¹⁾ with DiTemp DTS Raman Interrogator

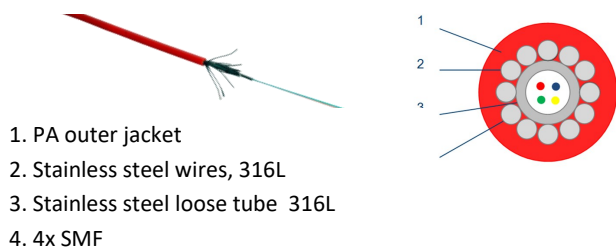
Deformation range: $\pm 1\%$

Temperature range: -20°C to $+70^{\circ}\text{C}$

Dimensions: Outer Diameter 6.5 mm

Installation: Clamping or Embedding (trench)

DiTeSt Temperature Sensing Cable



1. PA outer jacket
2. Stainless steel wires, 316L
3. Stainless steel loose tube 316L
4. 4x SMF

Monitoring fibers: 4 SMF => Temperature (BOTDR)

Temperature range: -40°C to $+85^{\circ}\text{C}$

Dimensions: Outer Diameter 4.8 mm

Installation: Clamping or Embedding (trench)

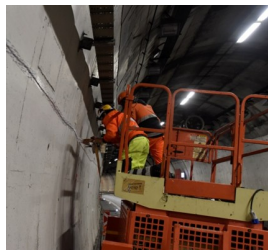
SERVICES: TECHNICAL ASSISTANCE / COMMISSIONING / TRAINING / REMOTE SUPPORT

Our team of qualified field engineers and technicians provides worldwide support on numerous projects to ensure seamless installations and operation of DiTeSt monitoring systems.

Cable glued on steel girder



Cable glued on concrete liner



Cable fixed on rebars prior to concrete pouring



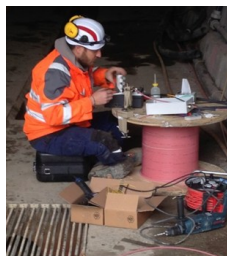
DiTeSt dedicated instrumentation cabinet



Cable clamped on concrete blocks



Optical splicing at site



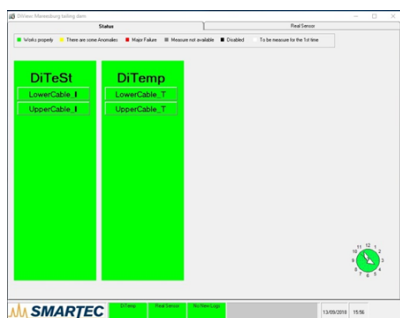
Cable glued inside a penstock



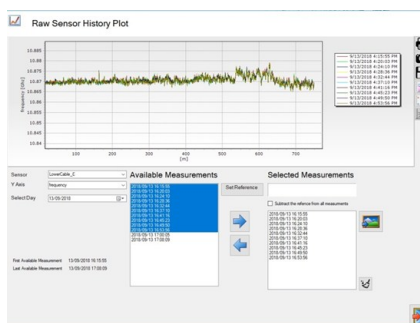
DIVIEW II GRAPHICAL USER INTERFACE (GUI): VISUALIZATION, POSTPROCESSING, ALARMING



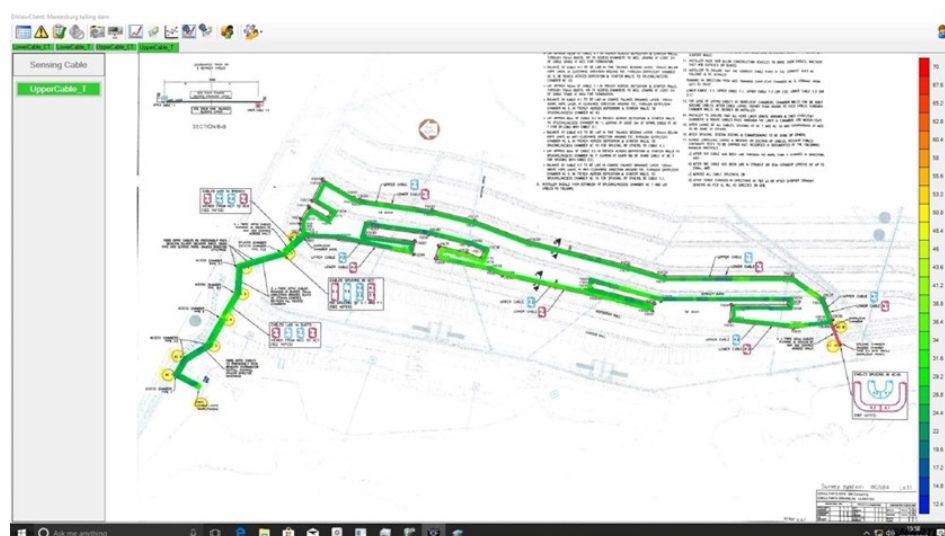
DiView II is designed for long-term monitoring. DiView II enables data storing, processing, representation and analysis, as well as for the control of single or multiple DiTeSt and DiTemp interrogators. DiView . DiView II is installed on a separate PC / Server.



Status panel



Raw data



Client view

Technical features	BOTDA operating mode	BOTDR operating mode
Number of channels:	Default: 4 built-in channels	
Sensor configuration:	BOTDA (user selectable), loop configuration	BOTDR (user selectable), single-end configuration
Optical budget (*):	16 dB sensing (32 dB total loop loss budget)	10 dB
Distance range (per channel):	80 km (160km max. total fiber loop distance)	45 km
Spatial resolution(*):	1 m to 20 m (by increment of 0.25 m)	1 m to 20 m (by increment of 0.25 m)
Sampling resolution (*):	0.25 m (1 m)	0.25 m (1 m)
Acquisition time (*):	5-10 minutes typical 10 -20 minutes for high resolution measurements	
Measurement range:	Brillouin Freq. Shift: 0.1 MHz ; Range from 9.5 GHz to 12.5 GHz Temperature : 0.1 °C ; Range from -150 °C to +1000 °C (fiber dependent) Strain: 2 µε ; Range > 5%	
Fiber typology:	Standard single mode optical fibers (ITU G.652, ITU G.655, ITU G.654, ITU G.657)	
External Switch compatibility:	1 channel can be extended to up to 20 channels (BOTDA or BOTDR, user selectable), with DiTeSt Multiple Channel Optical Switch	

Technical specifications

Operating temperature:	0°C to 45°C
Humidity:	Max 85% non-condensing
Protection rating	IP20 (indoor use)
Power supply:	100-240 VAC Typ. (90-264 VAC) / 50-60 Hz Typ. (47-63 Hz) / <150VA (or Optional 18-36 VDC)
Dimension (WxDxH):	449 x 500 x 177.8mm (19" rack mountable - 4U high)
Weight:	15 kg
Communication options:	2 x Ethernet port (RJ45)
Optical connectors:	SC / APC (rear panel) - optional E-2000 / APC
Graphical interface:	Configuration Software and Data Viewer Software DiView (Optional) automatic visualization, post-processing and alarming Software on external server
Operating system	LINUX- 64 bit OS on Solid State Drive (SSD)
Data storage:	Internal hard disk (> 500 GB or more) or Optional Solid State Drive (SSD) (> 250 GB). Optional additional data storage - External data storage (SATA port on rear panel)
Data format:	Proprietary Database, Text Files
Laser safety:	DITEST products emit invisible infra-red radiation in the 1550 nm wavelength range classified to EN 60825-1 (2014) as Class 1M laser products

Certification and compliance

CE mark (Council Directive 2006/95/EC and 2004/108/EC), RoHS (Council Directive 2002/95/EC), WEEE (Council Directive 2008/34/EC) CSA US + CA (UL-61010-1 3 Ed; CAN/CSA C22.2 NO61010-1-2)

(*) Specified according to SEAFOM MSP-01 and IEC 61757-2-2

Accessories and Ordering information

- 11.2020 DiTeSt Multiple Channel Optical Switch
- 20.2010 DiView Data Management Software

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