

The nerves of your structure



fTB 5020

Fiber-optic sensing system for distributed strain and temperature monitoring

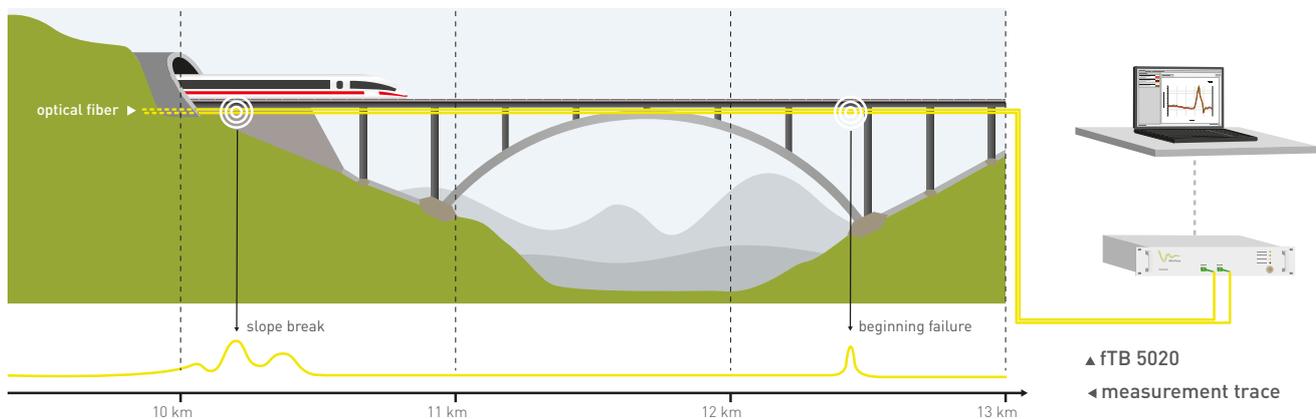
Reliable and uninterrupted monitoring

Uninterrupted monitoring is essential to manage risks and maintenance of large structures. Where kilometers of concrete, steel or soil are to be monitored for the early signs of failure, distributed optical fiber sensors are a powerful and highly efficient tool.

fbrisTerre answers the demand for long-term monitoring of pipelines, power cables, railway lines and geotechnical infrastructure. Industry-leading accuracy, resolution and reliability is empowered by fbrisTerre's unique core technologies: the patented Brillouin Optical Frequency Domain Analysis

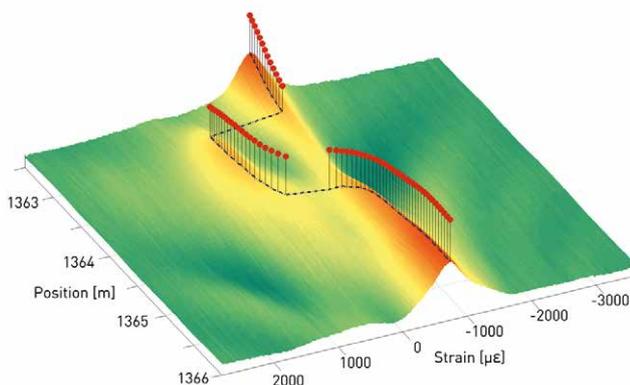
(BOFDA) for high-resolution loop measurements, and the patent-pending Brillouin Optical Frequency Domain Reflectometry (BOFDR), enabling measurement configurations with access to only one fiber end.

The fTB 5020 system uses industry standard optical fibers (the same used in everyday telecommunications) as continuous, long-range strain and temperature sensors. Application-specific cabling solutions allow for reliable and versatile implementation into earth and rigid structures.



Brillouin distributed sensing

An optical fiber will – literally – start to shiver when laser signals are injected, as the light creates an acoustic wave inside the fiber. Influenced by this acoustic wave, the light that arrives at the instrument carries information about the fiber's material density and, consequently, on its strain and temperature at each position.



Typical applications

- Oil and gas pipeline and borehole monitoring
- Early failure detection in geotechnical structures
- Structural health monitoring of bridges, tunnels, dams
- Strain and temperature monitoring in mining
- Displacement and seepage monitoring of river embankments

The complete monitoring solution

- Quality installation and management through a strong network of partners and integrators
- Tailored service packages for new constructions
- Specific solutions for retro-fitting of existing structures
- A long-term partnership for reliability in service, maintenance and system upgrades



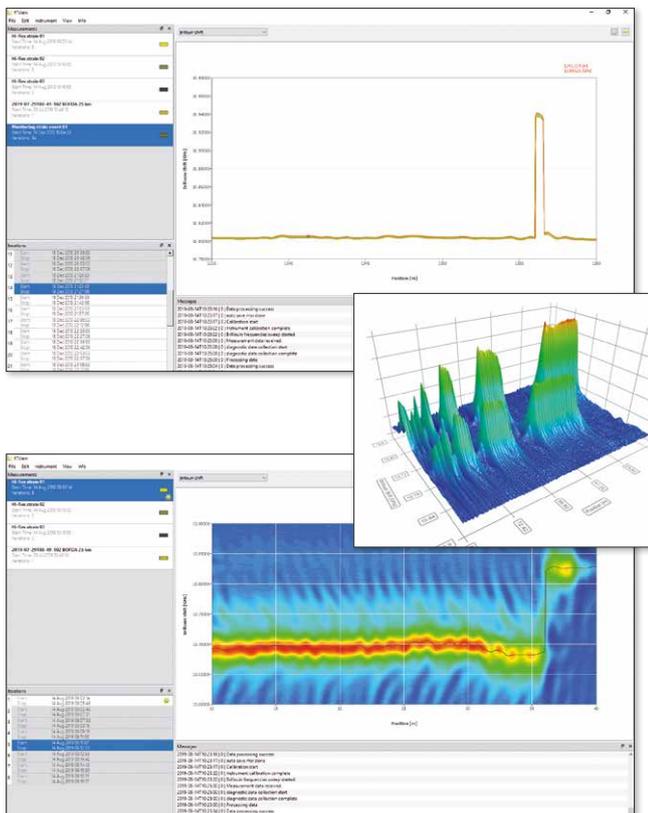
Key features

Highest accuracy in loop configuration – over 10 years of fibrisTerre's Digital BOFDA technology

- Spatial resolution down to 20 cm
- Distance range up to 80 km fiber length
- Superior attenuation budget
- Full loop measurement, no return fiber needed
- High-precision measurement of fiber length

Field-proven robustness for demanding assignments

- Single-ended measurement option – unique Digital BOFDR technology
- Small and light-weight: 6 kg, 2 rack units high
- Low power consumption: 30 W – dustproof, fanless case design
- Options for multi-channel monitoring available



The user interface

The FTB 5020 readout unit is controlled by a remote or local PC or workstation via Ethernet.

ftView, fibrisTerre's powerful monitoring software, enables the user to configure, perform, display and manage measurements.

- Easy measurement setup
- Automatic long-term monitoring in user defined intervals
- A unique, powerful signal processing engine
- Multiple data export, management and visualization options
- Access to all raw data
- Multiple interfacing options for remote control and SCADA integration
- Windows and Linux support

fTB 5020 series

Performance, features and technical data

BOFDA technology mode – Sensor configuration: Fiber loop

Distance range (fiber loop)		25 km – 50 km ¹⁾ – 80 km ¹⁾
Spatial resolution	up to 2 km fiber	0.2 m ²⁾
	up to 25 km fiber	0.5 m
	up to 50 km fiber ¹⁾	1.0 m
	up to 80 km fiber ¹⁾	2.5 m
Spatial accuracy		0.05 m
Dynamic range ³⁾		> 20 dB
Measurement repeatability ⁴⁾	strain	< 2 µε
	temperature	< 0.1°C
	Brillouin freq. shift	< 100 kHz, 9 - 13 GHz range ⁵⁾
Acquisition time ⁶⁾	0.2 km fiber	20 seconds
	2 km fiber	40 seconds
	10 km fiber	5 minutes
	25 km fiber	15 minutes

BOFDR technology mode – Sensor configuration: Single-ended

Distance range		25 km
Spatial resolution		1.5 m
Measurement repeatability ⁴⁾	strain	< 20 µε
	temperature	< 1°C
	Brillouin freq. shift	< 1 MHz, 10 - 13 GHz range ⁵⁾

General information

Optical connectors		E-2000 / APC, Cleanable FC /APC
Communication interface		Ethernet
Supported platforms		Windows and Linux
Data interfacing / SCADA		File export (binary, text), Telnet, Modbus TCP/IP, SNMP, proprietary API
Measurement modes		Manual measurements and autonomous monitoring schedule; detection of fiber length and attenuation
Operating temperature		0 - 45°C
Relative humidity		5 - 95%, non-condensing
Power supply		100-240 V, 47-63 Hz
Power consumption		30 W
Physical dimensions	L x W x H	365 x 483 x 88 mm (19" rack case)
Weight		6 kg
Laser class		1M

¹⁾ Standard distance range is 25 km. Options: fTB 5020 LR: 50 km (loop); fTB 5020 ULR: 80 km (loop)
Configurations providing 25/50/80 km one-direction (with blind return fiber) available upon request.

²⁾ Optional feature "Enhanced resolution" selectable in user interface

³⁾ High optical losses along the sensing fiber may degrade the strain / temperature accuracy.

⁴⁾ Measurement repeatability (2σ) corresponds to the accuracy under the assumption of ideal calibration coefficients.

Distance range, spatial resolution, measurement accuracy and acquisition time are interdependent.

⁵⁾ Measurement range covers full strain and temperature range defined by the physical properties of optical fibers.

⁶⁾ Typical acquisition time varies with measurement parameters such as resolution, accuracy, strain / temperature range.

The company

fibriTerre is a Berlin based designer and manufacturer of distributed fiber optic sensing solutions for simultaneous strain and temperature measurements. With a strong focus on research and development, fibriTerre offers cutting edge solutions for structural health monitoring projects in the energy sector, in civil construction and geotechnical engineering.

a spin-off of:



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