

The nerves of your structure



fTB 5020

Fiber-optic sensing system for distributed strain and temperature monitoring

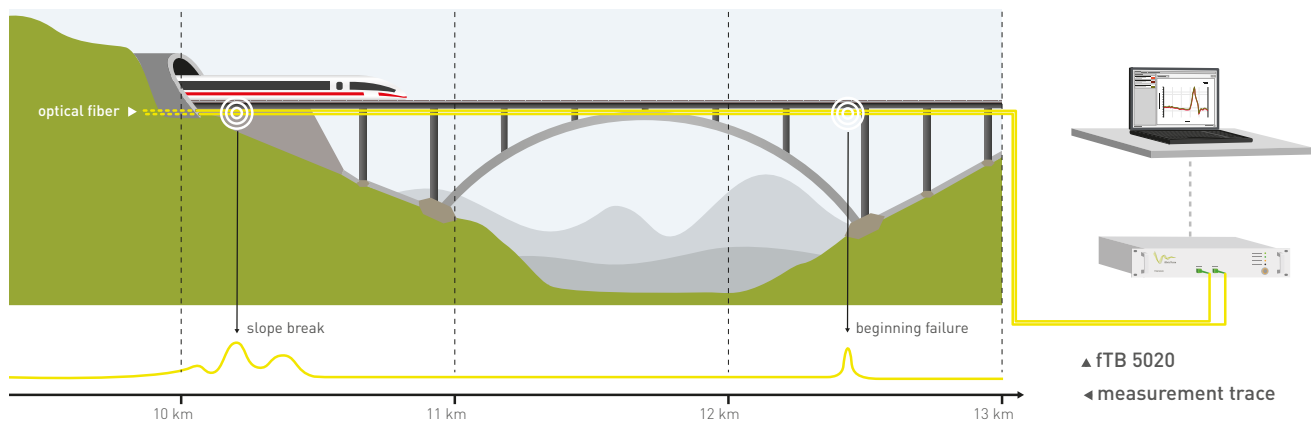
Reliable and uninterrupted monitoring

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.

fibrisTerre 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 fibrisTerre's unique core technologies: the patented Brillouin Optical Frequency Domain

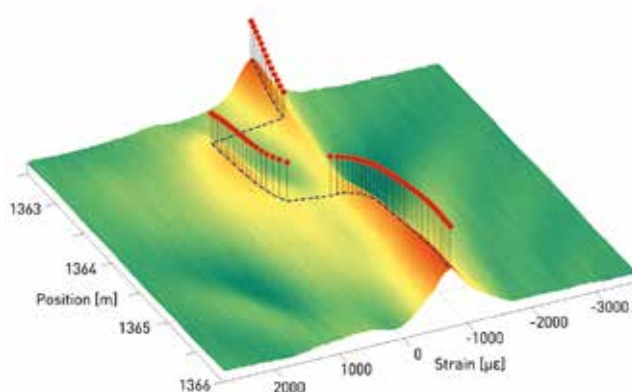
Analysis (BOFDA) for high-resolution loop measurements, and the patent-pending Brillouin Optical Frequency Domain Reflectometry (BOFDR), enabling measurement configurations with access to only one fiber end.

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



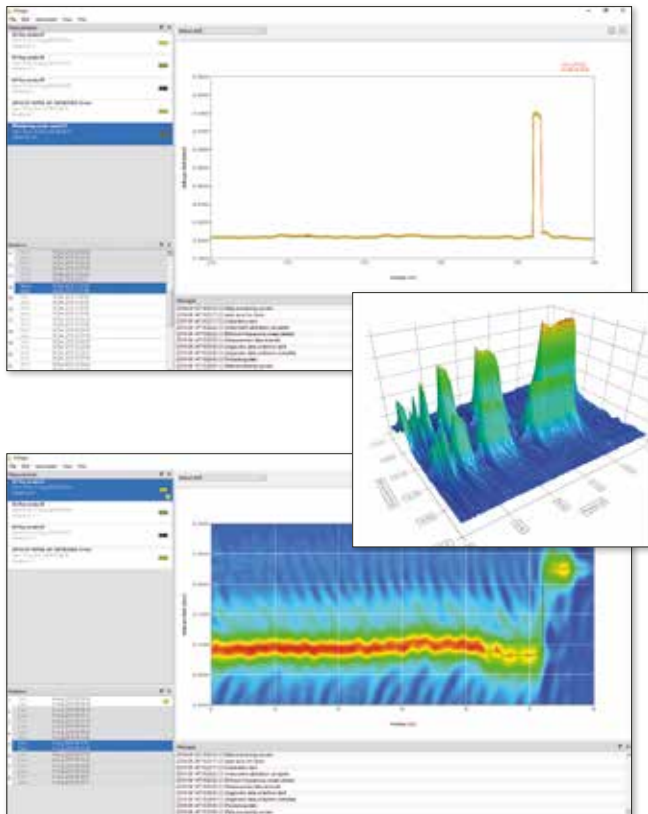
Key features

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

- Spatial resolution down to 20 cm
- Distance range up to 50 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: 7 kg, 2 rack units high
- Low power consumption: 40 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)		50 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	
Spatial accuracy		0.05 m	
Dynamic range ³⁾		> 20 dB	
Accuracy ⁴⁾ and range	strain	Accuracy	Range
	temperature	< 2 µε	+/-3% ⁵⁾
	Brillouin freq. shift	< 0.1°C	-200 to +1000°C ⁵⁾
		< 100 kHz	9 – 13 GHz
Typical acquisition time ⁵⁾	0.2 km fiber	20 seconds	
	2 km fiber	1 minute	
	10 km fiber	8 minutes	
	25 km fiber	25 minutes	

BOFDR technology mode – sensor configuration: single-ended

Distance range		25 km	
Spatial resolution		1.5 m	
Accuracy ⁴⁾ and range	strain	Accuracy	Range
	temperature	< 20 µε	+/-3% ⁵⁾
	Brillouin freq. shift	< 1°C	-200 to +1000°C ⁵⁾
		< 1 MHz	9 – 13 GHz

General information

Optical connectors		E-2000 / APC, other options available
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, attenuation
Operating temperature		0 - 45°C
Relative humidity		5 - 95%, non-condensing
Power consumption		40 W
Physical dimensions	L x W x H	365 x 483 x 88 mm (19" rack case) Desktop case (436 mm width) upon request
Weight		7 kg
Laser class		1M

¹⁾ Standard distance range is 25 km. Options: 50 km (loop) and 25/50 km one-direction (with blind return fiber)

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

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

⁴⁾ Accuracy expressed in terms of measurement repeatability (2σ), assuming ideal calibration coefficients

⁵⁾ Limited by optical fiber

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

The company

fibrisTerre 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, fibrisTerre 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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