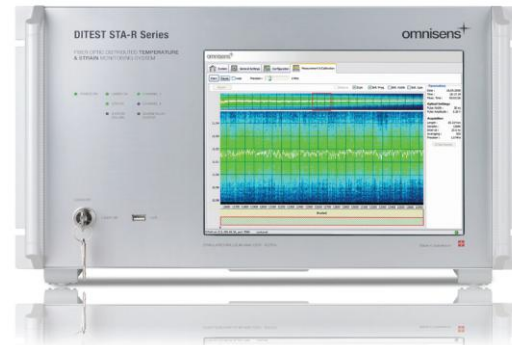


Superior Monitoring Performance

- Longest distance distributed sensing – 50km per channel
- Simultaneous fast and accurate temperature and strain measurements
- Robust optical budget supports the most demanding deployment conditions



Intelligent Measurement Control and Configuration

- Automatic measurement settings maintains highest instrument performance
- Self-adjusting configurations to varying external conditions
- Intelligent measurement control and performance diagnostic

Complex Monitoring Configurations Made Easy

- Library of pre-configured calibrated sensing elements
- Combinations of multiple cable/fibre sections in single configuration
- Well adapted to complex applications combining temperature and strain sections

Powerful Measurement Data Management

- Advanced data management, storage, interpretation and analysis
- Full remote control capabilities of multiple instruments



Superior Measurement Performance

The superior DITEST sensing technique offers fast and accurate strain and temperature measurements and its associated configuration flexibility makes the DSTA-R well adapted to demanding applications.

The use of stimulated Brillouin scattering in single mode fibres makes possible high spatial resolutions (down to 0,5m) measurements with short updating times while offering long distance measurement capabilities with optimised performances in terms of spatial resolution and measurement resolution (see figure 1).

The DSTA-R series integrates an enhanced optical signal processing and a complete control of optical signal levels which are automatically adapted to the sensing conditions. This outstanding measurement flexibility leads to an unrivalled dynamic range (up to 20dB of optical budget) which guarantees that the measurement performance is maintained even in the case of large fibre losses.

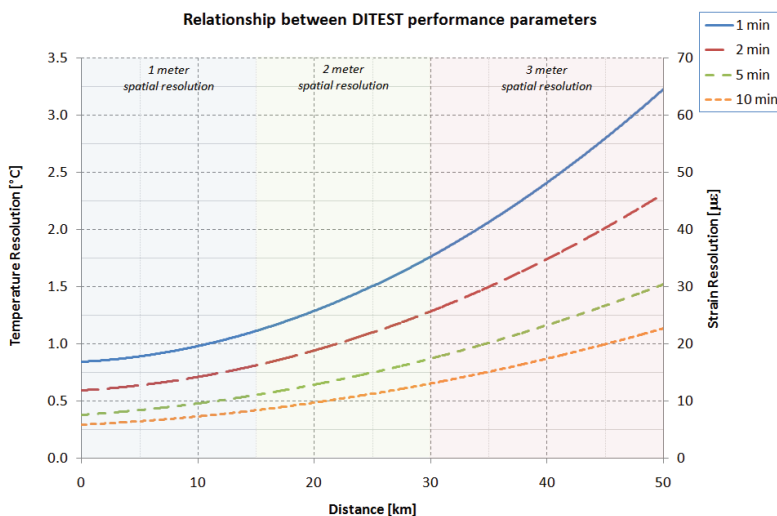


Figure 1

Figure 1: the measurement performance figure shows typical achievable performances in terms of temperature and strain resolution (2σ repeatability) obtained with the designated typical recommended spatial resolution from 1m to 3m depending on the distance range. The performance specification of distributed monitoring system requires mentioning interrelated parameters such as distance, spatial resolution, acquisition time and fibre attenuation. The most appropriated performance description is a graphical presentation with the additional mention of the measurement settings.

Intelligent Measurement Configuration

The DSTA-R Series integrates an intelligent configuration routine which automatically configures the measurement parameters and optimises each measurement with respect to targeted performance.

Sensor Auto Configuration

Once a sensing fibre is connected to the instrument, the intelligent measurement configuration routine automatically adjusts the measurement settings such as:

- Distance and sampling interval
- Measurement contrast optimisation
- Temperature and strain measurement range

Measurement Optimisation

While measurements are being performed, the user has full flexibility to change the measurement parameters and to adapt them to specific situations or project requirements.

Measurements parameters are:

- Spatial resolution / number of distance points
- Measurement repeatability / resolution
- Acquisition time

Measurements are made in a very simple way, since the instrument automatically controls and optimises the measurement based on the required performance parameters defined by the user. Alternatively, a given acquisition time can be set by the user and the measurement configuration is automatically adjusted in order to maintain an optimised measurement resolution within the specified measurement updating time.

The system integrates self performance monitoring which provides information about the measurement quality of every temperature or strain profile and which ultimately is used to adapt the measurement settings in the case of varying sensing conditions.

Advanced Graphical User Interface

In practical applications, a sensing cable is often made of several different optical fibres or cable types with different characteristics and lay loss.

The instrument Graphical User Interface (GUI) allows the user to segment the monitoring distance in sections associated to different fibre characteristics (e.g. index of refraction, fibre excess length, junction boxes, lead cable length, etc).

The system includes a library of comprehensive pre-configured calibrated sensing elements featuring the most commonly used optical fibres and cable sensors. User-defined fibre sensor types can be added to the library to complement the provided database of sensors, whereas we could assist users in the calibration of specific sensing cables. An unlimited number of configurations can



be stored in the database and exchanged between different DITEST instruments, which is useful for routine measurements, reducing the likelihood of differences in user criteria and ensuring fast setup and operation.

The DSTA-R combines the versatility and flexibility of a Test and Measurement instrument with the requirements of long term automatic and unattended monitoring. Measurement sequences using pre-defined configurations can be programmed and automatically recorded according to a scheduler. The instrument continuous performance monitoring is able to qualify and to store measurement quality indicators together with measurement data for further data analysis. Fibre breaks are also detected and accurately located in a couple of seconds.

Data Management and Versatility

The configurations and complete measurement data, including measurement settings and quality indicators, are stored in a dedicated database format enabling reliable data storage and easy retrieval for data interpretation.

Multiple measurement profiles can be compared, allowing the identification of the smallest relative deviations compared to predefined baseline or reference measurement. The GUI integrates advanced visualisation tools for data sorting/filtering, advanced measurement analysis and measurement evolution as a function of time. Measurement data can be exported to various format types including txt files, Excel files, and bitmap image of graphical plot.

The DSTA-R Series was designed for efficient data communication with third party systems as well as other DITEST instruments and solutions. Modbus TCP/IP for status and event communication is integrated, while full measurement data can be automatically broadcasted to registered computers using selectable data formats.

The DSTA-R Series features complete remote control capabilities enabling instrument configuration, event diagnostic and maintenance through TCP/IP connection.

Every project has its own specificity and the best performance is obtained by a careful selection of the sensing fibre cable and its integration. We provide customer support and assistance in the definition of the appropriate monitoring solution with respect to application requirements.

Application oriented solutions based on the DITEST measuring technique have been developed aiming at offering turn-key solutions to specific industry problems such as:

- DITEST-AIM: Asset Integrity Monitoring
- DITEST-LTM: Long Distance range Temperature Monitoring
- DITEST-SHM: Structure Health Monitoring.

Standard Specifications

Performance	
Number of Channels	2 independent and selectable channels (standard) Compatible with up to 20 ch external switches – model SO-N (optional)

Sensor configuration	Two fibres (loop) or single fibre (mirror ended) ² configuration		
Sensing fibre	Standard single mode fibres		
Distance range	50km		
Spatial Resolution ¹ Typical	0,5 to 20m (by increment of 0,1m) 1m at 20km / 2m at 30km / 3m at 50km		
Distance resolution	0,1m		
Number of distance points	100'000		
Dynamic range	10db (with no effect on performance) Up to 20db for distance up to 6km, with 1m spatial resolution		
Measured variables	Strain, Brillouin Frequency shift, Brillouin gain and width		
	Brillouin Freq. shift	Temperature	Strain
Resolution	0,1 MHz	0,1°C	2µε
Range	10GHZ to 13GHZ	-273°C to +700°C limited by optical fibre	-3% compression to 3% elongation
Acquisition time	>10sec, 1-2 min typical, 5-10 min for high resolution measurements		
Technical Data			
Graphical interface	SVGA300mm (12") colour screen (1024x768)		
Communications and Connections	Ethernet port, USB, RS232, SPST output relays (alarm and system status)		
Data Storage	Internal hard disc (160GB or more)		
Data format	Database, text files, MS Excel, bitmap plot		
Optical connectors	E-2000/APC		
Operating Temperature	0°C+40°C		
Dimensions (WxDxH)	449x500x266mm (19" rack)		
Weight	21kg		
Power Supply	100-240 VAC / 50-60Hz / <200 VA		
Features			
Measurement modes	Manual or automatic unattended measurements		
Configuration	Automatic measurement configuration (self adjusting to varying conditions)		
Data analysis	Measurement analysis, multiple trace comparison with respect to selectable baseline, measurement trends and time evolution, analysis at fixed distances		
Remote operating	Remote control, configuration and maintenance via TCP/IP		
Watch dog	Long term operation 24/7 guaranteed by automatic recovery and continuous self diagnosis		
System Monitoring	Continuous system monitoring including system status, measurement quality, fibre break detection and location		
Laser safety	DITEST products emit invisible infra-red radiation in the 1550nm wavelength range classified to EN 60825 (2001-03) as Class 1M laser products		

¹Spatial resolution defines the smallest detectable event along the optical fibre

²Longest distance range in single fibre configuration is reduced to 15km

Ordering Information



Part Number	Description
DSTA-R	Distributed Temperature and Strain System
Ditest SHW SW suite	Alarm and zone SW

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