



The DiTeSt-STA-R Series instruments integrate a technology pioneered by Omnisens offering distributed measurement of temperature and strain in real-time over tens of kilometers using single mode standard optical fiber and providing thousands of measurement locations.

### Features & Benefits

- High accuracy distributed strain and temperature measurements
- up to 100'000 measurement points over up to 50km
- High spatial resolution and fast acquisition time
- 0.1° C / 2 measurement resolution
- Large dynamic range (maintain accuracy at 10dB attenuation)
- Long-term stability
- Unattended automatic monitoring
- Distance range extension and remote monitoring capabilities up to 250km
- Cost effective for large number of measurement points

### Applications

- Structural Monitoring  
Strain and/or Temperature monitoring of large structures such as pipelines, off-shore plat-forms, oil wells, dams, dykes, bridges, buildings, geostructures, tunnels, cables, ...
- Transportation  
Roadways, railways monitoring, tunnels, ...
- Safety systems  
power cables, intrusion detection, waste disposal sites, landslides monitoring
- Fiber optic telecommunication  
Quality control during fiber cables production, cables maintenance, monitoring of local induced strains, dopant homogeneity measurements
- Domestic and environment monitoring  
Heating, ventilation and Air Conditioning (HVAC), Environment long term temperature measurements of sea, forests, grounds



Micron Optics, Inc.  
1852 Century Pl, NE  
Atlanta, GA 30345  
ph: 404/325-0005  
fax: 404/325-4082  
www.micronoptics.com

Instrument Performances

Models	DiTeSt STA-R
<b>Performances</b>	
Sensor's configuration	Loop
Distance range	50km
Number of channels	2
Spatial resolution	0.5-20m
Spatial resolution(full range)	1.5m
Distance Resolution	0.2m
Stain resolution	2 $\mu\epsilon$
Stain range	-1.5%~1.5% or 3%
Temperature resolution	0.1 °C
Temperature range	-270 °C ~700 °C (depending on cable)
Acquisition time	20s (1-2min typical)
Number of distance points	100,000
Averaging	1~10,000
Optical Connections	FC-APC (E-2000 on demand)
Laser wavelength	1550 nm
Measured variables	Strain & Temperature, Brillouin Frequency shift, Brillouin gain and width
<b>Technical data</b>	
Dimensions	449 x 500 x 266 mm (19" rack)
Weight	< 20 kg
Power supply	115/230 VAC
Power requirements	< 400 W
Operating temperature	0°C to +40°C
<b>Features</b>	
Graphical Interface	SVGA 12" color screen
Remote operation	Remote control, configurable and maintenance via TCP/IP
Communication & connections	USB, Ethernet.
Data storage	Internal Hard disc(20 GB or more)
Data format	Database, text files, MS Excel, bitmap plot
Output signals	Software alarms via TCP/IP SPST, SSR relays(optional)



## Product description

The DiTeSt unique measurement technique opens a new era in the growing field of fiber optics distributed monitoring. It offers surveillance and monitoring capabilities for the control of large structures and processes, by providing identification and localization of potential problems everywhere temperature or strain information is the indication of important changes.

The “distributed” measurement concept refers to the use of a single optical fiber as a linear uninterrupted sensor providing multiple measurement points spatially continuously distributed over the whole fiber length. A single optical fiber cable actually replaces thousands of traditional pin-point sensors such as thermocouples or strain gauges, saving complex installation, calibration and maintenance costs. As a result, temperature and/or strain information is made available through profiles as a function of distance in one scan, providing simultaneous temperature/strain information of thousands of locations with a single instrument.

The DiTeSt-STA-R Series instruments features include user-friendly and simple operation, directly providing temperature and/or strain profiles of the fiber. The inherent high stability and reliability of the DiTeSt instrument software and hardware guarantees long term monitoring with the highest performances for surveillance and control of large infrastructures.

The DiTeSt STA-R Series of analyzer are fiber optics and laser-based monitoring systems using an optical interaction measurement principle called Stimulated Brillouin Scattering (SBS). SBS is an intrinsic physical property of the fiber material and provides important information about the strain and temperature distribution experienced by an optical fiber. Standard or special single-mode telecommunication fibers and cables can be used as sensing element and the threadlike geometry of optical fibers makes it ideally suited for multipoint sensing over great distances.

The local SBS characteristics are measured thanks to an innovative and highly reliable configuration. This proprietary technique is totally self-referenced allowing periodic measurements without any preliminary calibration. Multiple sensing fibers can be connected to the instrument and monitored automatically through internal or additional external optical switches.

The user interface includes configuration options for temperature or strain measurements, recordings analytical tools and features the flexibility of database oriented data storage. The analyzer is user configure able for automatic unattended monitoring and offers different alarm signals in addition to remote access and control possibilities.

The SBS interaction requires counter-propagating optical signals throughout the sensing fibers. This measurement scheme requirement can be achieved either by using a loop configuration where both fiber ends are connected to the instrument(STA-R) Longer distance coverage and highest accuracy can be achieved with loop measurement scheme. A loop inverter module is optional and offer the possibility to perform measurements over the complete loop distance offering either longer distance coverage or temperature and strain measurements when one fiber is configured as a temperature sensor and the return fiber as a deformation sensor.

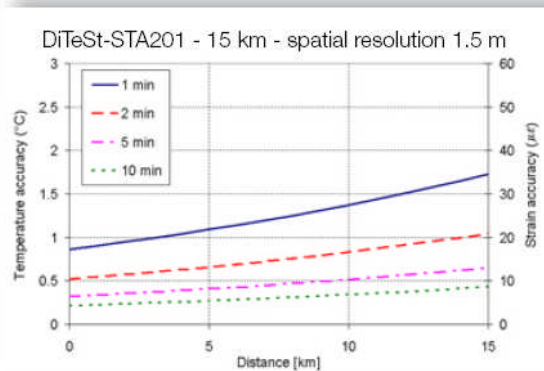
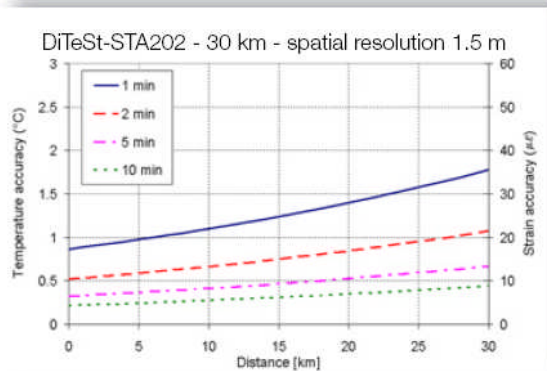
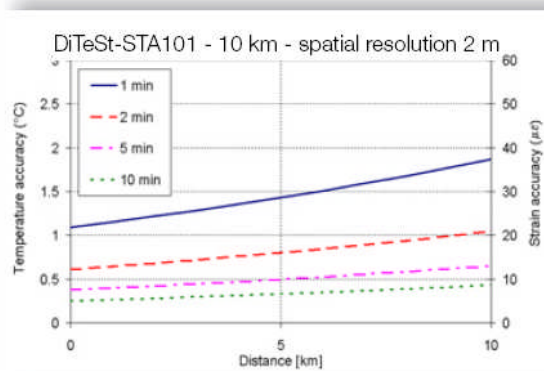
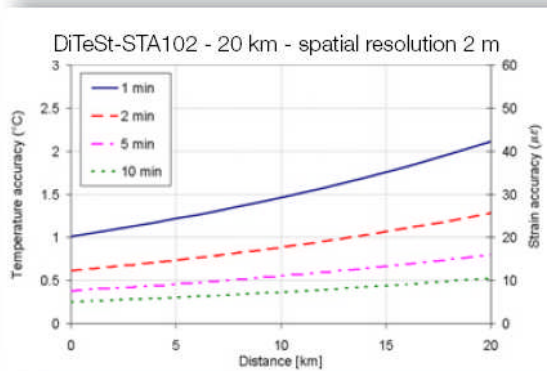


**MICRON  
OPTICS**

Micron Optics, Inc.  
1852 Century Pl, NE  
Atlanta, GA 30345  
ph: 404/325-0005  
fax: 404/325-4082  
www.micronoptics.com

## Performances

The instrument configuration flexibility allows the user to take advantage of the best performance of the instrument in every application. The hereunder figure shows typical achievable performances in terms of temperature and strain accuracy obtained with the highest spatial resolution available with the instrument models. The figures are given for acquisition times of 1minute, 2minutes, 5minutes and 10 minutes. Higher accuracy can be obtained by using a trade-off between the spatial resolution and measurement time in the sense that higher resolution can be obtained in a shorter acquisition time by compromising on the spatial resolution.



## Graphical User Interface (GUI)

The built-in computer incorporates a user-friendly Graphical User Interface and a 12" screen display, which makes the menus extremely easy to be accessed. The instrument can be configured for long term automatic unattended measurements. Sensing cables can be divided in multiple sections in relation with the installation topology; each section being configured with different measurement settings and alarm levels for full monitoring flexibility. Examples are simultaneous strain and temperature measurements with different fiber sensors and connected to the same instruments. Compensation of thermal effects on strain measurements can be done automatically offering the highest accuracy in environment subject to variations of temperature and deformations. The measurements are recorded automatically with the help of a scheduler, stored in a database and can be retrieved at any time for further analysis. The database is easily accessible from remote computers via TCP/IP through the use of a profile viewer software that comes with the instrument. Measurement data can be export to various format types including text files, Excel files or bitmap image of graphical plot.



Micron Optics, Inc.  
1852 Century Pl, NE  
Atlanta, GA 30345  
ph: 404/325-0005  
fax: 404/325-4082  
www.micronoptics.com

## GUI Features & benefits

Flexible and elaborated measurement setting configuration including :

- Spatial resolution, acquisition time, number of distance points,
- Powerful calibration tools for accurate strain and/or temperature measurements
- Sensing cable segmentation in user defined sections with different characteristics
- User defined alarm setting
- Automatic measurement with scheduler
- Unlimited number of stored measurement configurations

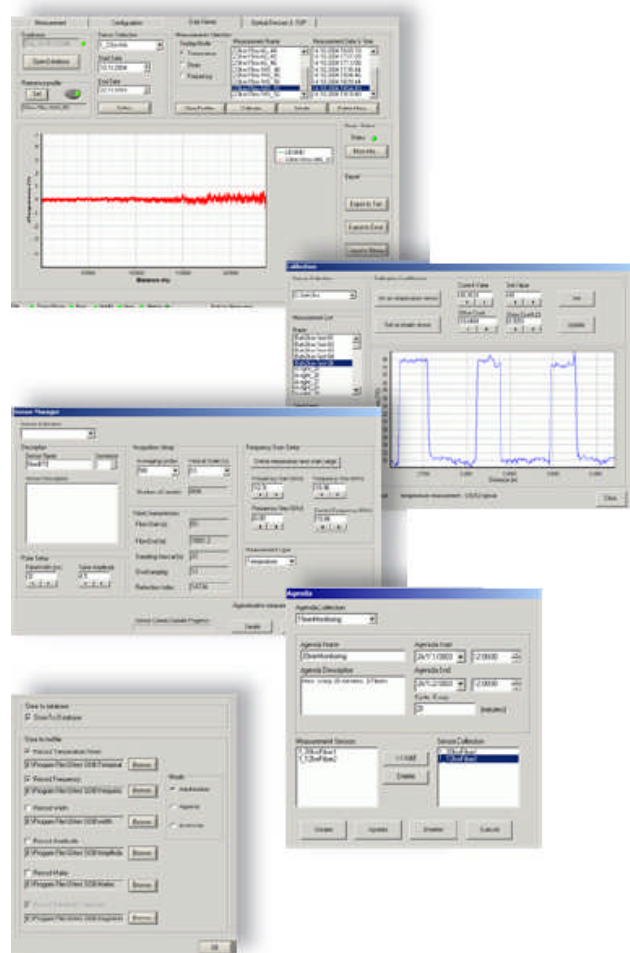
Data storage and analysis:

- Automatic analysis of recorded profiles with status information on measurement quality
- Multiple traces comparison with respect to selectable baseline, graphical zoom
- Automatic compensation of thermal effects on strain measurements
- Built-in database for data storage and retrieval
- Advanced data analysis including Brillouin gain and width profiles
- Various export options including text files, Excel files, or bitmap graphical plot

## System & fiber Integration

Every project has its own specific requirements and the best system performance is guaranteed by a careful selection of the sensing fiber and its proper integration.

Omnisens, through its network of specialized system integrators, provides customer support and assistance in the definition of the appropriate fiber in order to get the best performances as well as in the selection of all required accessories (connectors, connection boxes, termination boxes, data acquisition and analysis software).



Micron Optics, Inc.  
1852 Century Pl, NE  
Atlanta, GA 30345  
ph: 404/325-0005  
fax: 404/325-4082  
www.micronoptics.com

Micron Optics International Beijing Representative

Tel: 86 (10) 6296 2540/41. Fax: 86 (10) 6296 2543

Email: [sales@micronoptics.com.cn](mailto:sales@micronoptics.com.cn)