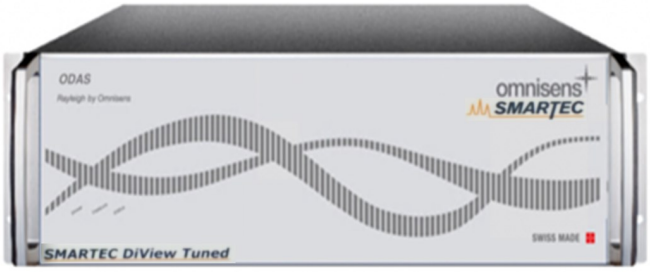
DiAS Acoustic Analyzer

DiAS



FIBER OPTIC DISTRIBUTED ACOUSTIC SENSING (DiAS)

Fiber Optic Distributed Acoustic Sensing (DiAS) is based on Rayleigh scattering sensing and localisation analysis technique and offers an accurate dynamic strain and vibration measurements for the geotechnical, civil and structural applications as well as for the Oil & Gas industry.

Description

The DiAS Acoustic Analyzer Reading Unit is a unique tool for the evaluation of distributed dynamic strain and vibration over several tens of kilometers. It is a powerful diagnostic instrument for the identification and localization of potential problems. It allows the monitoring of dynamic strain and vibrations at thousands of locations by means of a single optical fiber, and its inherent high stability and self-referenced principle of operation allow on-line or off-line long-term monitoring of large structures.

The DiAS Acoustic Analyzer Reading Unit is a laser-based measurement system using an optical scattering measurement principle within the sensing fiber: chirped Rayleigh scattering. It can operate using dedicated fibers and cables as sensing elements. The probing of single mode fibers with chirped Rayleigh scattering gives precision readings with high spatial resolution and complete insensitivity to fading noise.

The DiAS Acoustic Analyzer Reading Unit is fully compatible with SMARTEC DiView software for automatic data management and visualization. The DiView software allows to view the position of the detected events together with other distributed monitoring systems (if present) data such as the temperature and/or the strain.

The DiAS Acoustic Analyzer Reading Unit provides 1 channel (2 channels optional) with fast and accurate dynamic strain and vibration measurements up to 30 km (DiAS 0-30km) and 50 km (DiAS Long Range 0-50km).

The DiAS Acoustic Analyzer Reading Unit features remote control capabilities enabling instrument configuration, event detection and classification, and maintenance through a TCP/IP connection. Data can be migrated into other testing proprietary suites. The DiAS Acoustic Analyzer Reading Unit features an automatic rollover buffer to ensure the latest data is always available.

The DiAS Acoustic Analyzer Reading Unit is delivered as a stand alone (measuring unit and processing unit). An optional external desktop computer or server is available.

The instrument can be delivered in a portable rack or permanent rack with defined power options depending on user request.

Key Features

- Measurement range up to 50 km
- Measurement band width up to 1 kHz
- Strain and temperature sensitivity better than 1 nε
- Insensitive to fading noise
- GPS time synchronization
- Transportable
- Easy configuration
- Remote control
- Self diagnostic

Applications

- High accuracy distributed dynamic strain and vibration Measurements
- Detection and localization of third-party intrusion attempts
- Geotechnical, civil and structural integrity monitoring
- Environmental monitoring Detection
- Detection and localization of rock falls
- Geophysical applications
- Oil & Gas industry applications
- Pipeline Pig localization and tracking

DiAS Acoustic Analyzer

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Technical features	DiAS 0-30km	DiAS Long Range 0-50km
Measurement range per channel:	30 km	50 km
Built-in channels:	1 channel (2 channels optional)	
Sensor configuration:	Single ended	
Sensing fiber:	Standard single mode optical fibers: ITU G.652, ITU G657, ITU G.655	
Spatial resolution:	2 to 20 m	
Optical loss budget—sensing at 1550 nm:	6 dB	10 dB
Acoustic sensing band width:	1 kHz	
Sampling rate:	2 KHz	

Technical specifications

Data storage capacity:	Internal: HDD 4TB RAID1 (equivalent to 2.5 day of strain/raw data for 20 km monitoring) External: optional additional RAID up to 256TB
Data format:	HDF5— Open source
Protection rating	IP20
Data flow:	- Raw data: 50MB/ min / km / kHz sampling / at 10m SR - Compressed data: 25kB / min / km / Frequency band 10m SR Data recording both raw data and compressed data
GPS timing:	20 microseconds accuracy
Optical connectors:	SC/APC (E-2000 available on request)
Dimensions (W x H x D) mm:	Optical Unit: 483x132x435 Processing Unit: 483x177x448 19” rack mountable – 3U + 4U
Weight:	Optical unit: 8 kg / Processing unit: 19kg
Power supply:	100-240V and 50-60Hz AC
Power consumption:	Optical unit: typical 30 – Max 70 W depending on configuration Processing unit: typical 230 – Max 500 W depending on configuration
Operating temperature:	0° C to 40° C
Transportation/storage temp:	-10° C to 60° C
Ambient humidity:	5 to 85% RH (no condensation)
MTBF / lifetime:	10 years / 25 years
Embedded system	Linux

Standards

EN 61326-1:2013 (IEC 61326-1:2012, ed2.0)
Electrical equipment for measurement, control and laboratory use -- EMC
EN 61000-6-2:2005 (IEC 61000-6-2:2005, ed2.0)
Electromagnetic compatibility -- Immunity for industrial environments
EN 61010-1:2010 (IEC 61010-1:2010)
Electrical equipment for measurement, control, and laboratory use – Laser class 1M

Accessories and Ordering information

- 16.2011.PU DiAS Processing Unit
- 20.2010 DiView Data Management Software

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NOVA METRIX

Smartec SA reserves the right to make any changes in the specifications without prior notice