

Real-Time Intelligent Distributed Vibration Sensor

Sensa fiber-optic monitoring systems

APPLICATIONS

- Oil, gas, and water leak detection in pipelines
- Pipeline event intrusion monitoring
- High-voltage (HV) cable fault location
- Subsea asset monitoring
- Integrated and customizable display with SCADA data delivery

BENEFITS

- Gathering of necessary intelligence for swift preventive action
- Improved operability through minimized false alarms
- Increased process safety and reduced HSE risk with real-time scraper tracking
- Simplified operations with multiple capabilities delivered by one machine

FEATURES

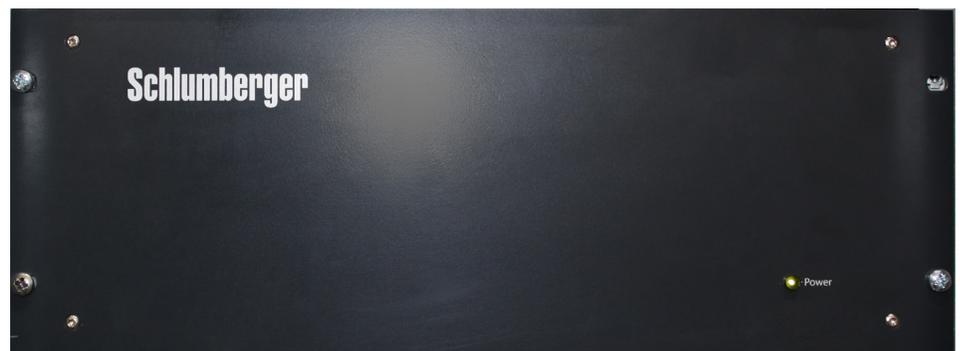
- Real-time detection, identification, and location of multiple simultaneous alarms
- Adjustable detection sensitivity along the asset relative to the local environment
- Customizable event recognition along the asset length
- Wide range of data delivery options
- Compatibility with multiple single-mode fiber types

The portfolio of Sensa* fiber-optic monitoring systems includes the heterodyne real-time intelligent distributed vibration sensor (DVS), which brings new high-performance capabilities to a broad range of asset monitoring applications both onshore and subsea. Developed from original DVS instrumentation that was created for permanent asset monitoring, the real-time intelligent DVS was progressed further to provide high sensitivity for use in reservoir monitoring applications. With a strong survey record of accomplishment across the globe, this new generation of sensors has been brought back into the permanent asset monitoring application.

The real-time intelligent DVS's optical interrogator unit is connected to an optical fiber embedded either within the HV cable construction or in a stand-alone buried fiber-optic cable along a pipeline.

The interrogator unit measures the Rayleigh backscattered light to provide a local linear measurement of the dynamic strain induced in the sensing fiber by mechanical and thermal signals from nearby sources.

A patented multifrequency heterodyne optical technique gives the real-time intelligent sensor best-in-class signal-to-noise ratio across the full sensing range of 25 mi [40 km]. In addition, the multifrequency approach works to suppress local fading effects that can leave other systems prone to the detectable signals disappearing and reappearing at random along the length of the fiber. Such a technique enables the optics system to interrogate measurements every 6.5 ft along the fiber length, thus providing many thousands of data points.



Accurately measuring every 6.5 ft along the length of a fiber, the real-time intelligent DVS enables swift preventive action and reduced HSE risk.

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Specifications

Measurement

Number of channels	One single-ended (SE)
Total fiber length (SE)	25 mi [40 km]
Loss budget (two way at 1,550 nm)	18.5 dB
Output	Full-aperture seismic waveforms or vibration logs

Measurement parameters

Native measurement type	Strain
Operating principle	Coherent phase measurement
Operating wavelength	1,550 nm
Range	25 mi [40 km]
Output spatial interval	6.6, 16.4, and 32.8 ft [2, 5, and 10 m]
Gauge length	16.4, 32.8, 65.6, 98.4, and 131.2 ft [5, 10, 20, 30, and 40 m]
Output time interval	0.1, 0.25, 0.50, 1.00, and 2.00 ms
Low-frequency limit	5 Hz [†]

Physical

Server rack

Dimensions (L × W × H)	37.60 in × 22.60 in × 13.11 in [955 mm × 574 mm × 333 mm]
Weight	132 lbm [60 kg]

Instrument rack

Dimensions (L × W × H)	37.60 in × 22.01 in × 9.61 in [955 mm × 559 mm × 244 mm]
Weight	66 lbm [30 kg]

Environmental

Temperature

Operating	32 to 113 degF [0 to 45 degC]
Storing	-4 to 158 degF [-20 to 70 degC]

Power

Maximum	400 W
Typical	600 W
Supply	100 or 230 V

Certifications

Laser safety	IEC/EN60824-1:2014 Class 1
Compliance	European Conformity (CE)
	Restriction of Hazardous Substances (CE Directive 2002/95/EC)
	Waste Electrical and Electronic Equipment Electromagnetic Compatibility (EMC) Directive EN 61326-1:2006
	EMC Directive 2004/108/EC
	Low-Voltage Directive 2006/95/EC

[†] Typical value; depends on application and condition.

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