1.Technica lBackground

Optical Fiber Sensing Technology and Application

In an optical fiber sensing system, the laser transmitting in optical fiber experiences subtle changes of its parameters (power, wavelength, frequency, phase and polarization etc.) according to external varieties (temperature, mechanical strain, displacements, vibrations, pressure and etc.) applied to optical fiber. The change modulates the original laser signals and then reaches a detector arrangement where signals are demodulated, and changes are measured.

Optical fiber sensing technology develops extremely fast and has been applied in a wide range of industries. Systems and solutions equipped with optical fiber sensing technology can be deployed in harsh environments to solve critical problems.

Optical Fiber Sensor Advantage

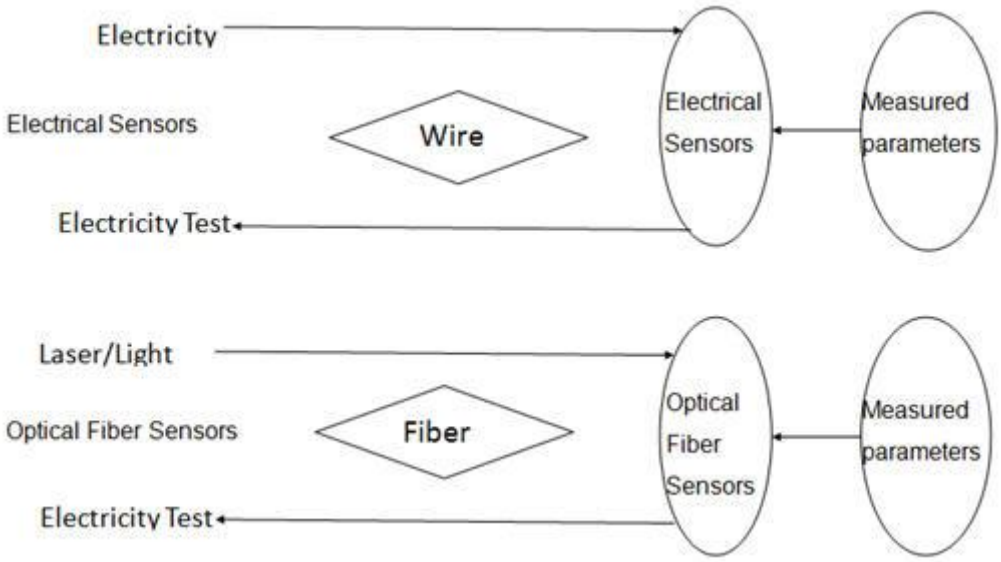
There are two general categories of optical fiber sensors: one type measure changes on fiber caused by external factors, the sensing process and transmission are both on optical fiber. Another type uses existing conventional sensors to acquire data and transmit thought optical fiber. Both types of fiber optic sensors can be further categorized into types of light intensity modulation, phase modulation, polarization modulation and wavelength modulation etc.

Compared with conventional sensors, optical fiber sensors have distinctive advantages:
(1) Completely passive, immune to electromagnetic interference,corrosion,resistant to high temperatures and chemically reactive environment, intrinsically safe: ideal for harsh and hostile environment like microwave and explosive environment, mines, petrochemical plants and etc.
(2) Potential for extremely high sensitivity, range, and resolution than most conventional sensors.
(3) Small size: ideal for embedding and surface mounting.
(4) Wide application: through evolution of optical sensing technology, one can measure nearly all of the physical measures of interest and a very large number of chemical quantities as: Temperature, Pressure, Flow, Liquid level, Displacement (Position), Vibration, Rotation, Magnetic fields, Acceleration, Chemical species, Force, Radiation, PH, Humidity, Strain, Velocity, Electric fields, Acoustic fields etc.
(5) Can monitor a wide range of physical and chemical parameters and is neutral to objects to be tested
(6) Remote operation over long distance without any lead sensitivity, ideal for networking with existing components to form sensing network.

(7) Lower cost than conventional sensors.

Below table is the comparison of optical fiber sensors and electrical sensors, optical fiber sensors are complementary to electrical sensors.

	Optical fiber sensors	Electrical sensors
Modulation Parameters	Amplitude, Absorption, Reflection etc.	Resistors, Capacitors, Inductors etc.
Sensitive Material	Photosensitive	Power sensitive
Signal Type	Laser/Light	Electric
Transmission Medium	Fiber/Optical cable	Wire/Cable



2.ShinewayTech FiberGuard Optical Fiber SensingSystem Overview

For some application areas, optical fiber sensing has been increasingly recognized as a technology with remarkably interesting possibilities, FBG and other grating type sensor is a good example. Researchers are focusing on the principle of optical fiber grating sensors and distributed fiber optic sensor system.

The demand of integrated security detection system for industrial facilities safety and civil engineering efficiency is rising, the solution is distributed optical fiber sensing system which supports continuous, uninterrupted, long distant and strong

affinity to objects under test. Distributed fiber optic sensing systems usually have three types: Raman type, Brillouin type and FBG type.

ShinewayTech*FiberGuard* optical fiber sensing solution includes 4 products:

ST-FBGFiber Grating Demodulation System

ST-DTSDistributed Optical Fiber Temperature Measurement System

ST-BOTDABrillouin Optical Time Domain Analysis & Demodulation System

ST-PDS Optical Fiber Perimeter Defense systems

For more product information, please download the attached file.