Experiment on Reflected Fiber Optic Displacement Sensing

Article Overview

Reflective fiber optic displacement sensors (RFODS) measure displacement by detecting variations in reflected light intensity, offering high accuracy and simple probe design.

Principles of RFODS

Reflective fiber optic displacement sensors operate by launching light from a source fiber toward a reflective target and collecting the reflected light with a receiving fiber. The intensity of the received light varies with the distance between the fiber end and the reflector, allowing displacement measurement. The system typically includes a light source (LED), a photo-detector, and a reflective target, which can be a flat surface, grating, or retro-reflective panel .

Experimental Setup
• Sensor Probe Design: A common configuration uses parallel source and receiving fibers fixed on one side of the probe. The light emitted from the source fiber forms a cone that reflects off the target and partially enters the receiving fiber. The overlap area between the reflected light cone and the receiving fiber core determines the received intensity .
• Reflective Target: Targets can be simple mirrors, retro-reflective panels, or gratings with periodic refractive index variations. Reflective gratings allow lateral displacement measurement and can provide signal subdivision for direction detection ...

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Polygerinos et al. described the behavior of two fiber-optic reflective light intensity displacement sensors utilizing a fiber

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Fiber optic displacement sensor with a large extendable measurement ...

The proposed fiber optic displacement sensor guarantees a stable reflected signal acquisition for application in real

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Fiber-optic sensor

A fiber-optic sensor is a sensor that uses optical fiber either as the sensing element ("intrinsic sensors"), or as a means of relaying

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However, multi-parameter simultaneous sensing is the common requirement in many applications. In this paper, we

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Abstract A sensitive intensity modulation differential optical fiber angular displacement sensor has been developed.

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