

Fiber Optic Sensor for Surface Roughness Measurement



AI Overview

Fiber optic sensors provide high-precision, non-contact measurement of surface roughness, ideal for fragile or micro-scale components. Overview Fiber optic surface roughness measurement sensors use light transmitted through optical fibers to evaluate the texture of a surface without physical contact, making them suitable for delicate or highly precise components. These sensors can measure key roughness parameters such as R_a (mean roughness), R_z (mean roughness depth), R_k (core roughness depth), and R_{max} (maximum roughness depth) in compliance with DIN EN ISO standards. Working Principle The sensor typically consists of a light-emitting fiber and multiple light-receiving fibers arranged coaxially. The system measures the intensity of reflected light, which varies with the distance between the probe and the surface. By calibrating the correlation between light intensity and surface roughness using reference samples, the sensor can determine the roughness of machined surfaces in real time. Automatic signal optimization ensures consistent measurements even on heterogeneous or technical surfaces. Advantages Non-contact measurement: Prevents damage to fragile or clean surfaces, unlike stylus-based methods. High speed and frequency: Fiber optic sensors can measure surfaces at speeds up to 10 mm/s with frequencies up to 20 kHz, enabling inspection during production. Miniaturized probes: Probes as small as 50 μm can access micro-drilled holes down to 0.1 mm. Integration flexibility: Sensors can be integrated into coordinate measuring machines, robotic loaders, or precision machine tools, allowing automated and inline quality control. Reproducibility and standards compliance: Measurements follow internationally recognized roughness parameters and ISO standards, ensuring reliable quality assessment. Applications Fiber optic roughness...

Article Content

Optical fiber Fabry-Perot silica-microprobe for a gas pressure sensor ...

Compared with other kinds of fiber optic gas pressure sensors, the optical fiber FPI sensor has been regarded as a research hotspot and applied to static and dynamic pressure measurement

Measuring surface roughness with high accuracy | fionec fiber optics

In contrast with tactile measuring devices, fiber-optic sensors from fionec do not affect or damage the surface of the test specimens. This makes it possible to perform roughness measurements even on

4D-LysM functionalized optical fiber SPR sensor for selective

Considering the complex interfering substances in marine environments, this study developed an optical fiber surface plasmon resonance (SPR) sensor for selective detection of

Roughness Measuring Station – Non-contact precision | fionec fiber

The fionec RMP surface roughness measuring station is based on a high-precision fiber-optic measuring device for a standards-compliant evaluation of roughness parameters.

D-shaped optical fiber-based refractometer for olive oil adulteration ...

Based on this scenario, this work presents a D-shaped optical fiber-based refractive index sensor to detect adulteration of olive oil caused by the addition of canola, corn, cotton, soybean and

Cutting temperature measurement in turning using fiber-optic multi ...

Abstract The cutting temperature is essential for phenomena understanding and quality improvement in metal cutting while its in-situ online measurement is still a challenge. This paper

High precision reflective seven-core optical fiber surface roughness sensor

Surface roughness is one of the important parameters in the production process of micro-nano devices. However, traditional fiber optic surface roughness sensors have low integration and

Home | Hamamatsu Photonics

The official website of Hamamatsu Corporation whose mission is to advance science and industry through photonic technologies. Our products include optical sensors and components, cameras, light

A Reflective Fiber Optic Sensor for Surface Roughness In-Process ...

The paper deals with the development of a fiber optic sensor for surface roughness measurement. A new method for the calculation of reflection light intensity is proposed.

Surface roughness measurement based on fiber optic sensor

The multi-wavelength fiber sensor for measuring surface roughness and surface scattering characteristics were investigated. In this paper, specimens w

Twin-Core Fiber-Based Mach Zehnder Interferometer for

In this paper we present an all-fiber interferometric sensor for the simultaneous measurement of strain and temperature. It is composed of a specially fabricated twin-core fiber spliced between two pieces

A new fiber optic sensor for inner surface roughness measurement ...

In order to measure inner surface roughness of small holes nondestructively, a new fiber optic sensor is researched and developed. Firstly, a new model for surface roughness...

A Fiber Optic Sensor for Surface Roughness Measurement

A fiber optical interferometer system is described for non-contact measurement of surface topography. The system employs a fiber optic guide and lens arrangement that forms an

Method of surface roughness measurement using a fiber-optic probe

A method of surface roughness measurement is disclosed which uses a fiber-optic probe having a sensor head constituted of a light-emitting fiber and multiple light-receiving fibers...

eFunda: Introduction to Fiber Optic Sensors

The Fotonic sensor is a displacement sensor containing two groups of fiber optics, one set connected to a light source and termed the transmitting fibers, and the other set connected to a photo detector

Photonics Suppliers | Suppliers | Photonics Buyers" Guide | Photonics ...

Laser and LED measurement products, including laser power/energy meters, beam profilers measuring femtowatt to hundred-kilowatt lasers, high-performance IR/visible optical elements, IR thermal

Fiber optic tactile sensor for surface roughness recognition by

The fiber optic tactile sensor, which is based on the Fabry-Perot interferometer principle that allows a functional single-point detection structure and enables SRR, is the subject of this study.

Design and development of electromechanical smart graphene

This investigation says about design and development of electromechanical smart graphene nanoplatelet-doped polymer-matrix composite sensors. This article aims to monitor the

Fiber optic volatile organic compound gas sensors: A review

Fiber optic sensors, as intrinsically safe, miniature, portable, immune to electromagnetic interference, and easy to remote sensing and multiplexing sensing technology, are utilized in VOC

A fiber optic sensor for the measurement of surface roughness and ...

Abstract: This paper presents a fiber optic sensor system, artificial neural networks (fast back-propagation) are employed for the data processing. The use of the neural networks makes it

Application of optical fiber distributed sensing to health monitoring ...

OBR sensors offer a continuous monitoring of strain and temperature along the fiber. They can be easily placed on a concrete surface despite the existing roughness. OBR sensor is capable to

High precision reflective seven-core optical fiber surface roughness

We present a high precision fiber roughness sensor based on annular core optical fiber (ACF). The ACF has a cone-frustum-shaped tip to enable the annular core to generate a focused ring...

Improving turbulent airflow direction measurements for fiber-optic ...

Abstract. This study investigates the impact of microstructure geometry on the thermal and turbulence responses of electrically heated fiber-optic (FO) cables under varying flow conditions and turbulence

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://adikor.eu>

Email: info@adikor.eu

Phone: +33 6 48 37 92 15

Address: 12 Rue de la Paix, 75002 Paris, France

This document is for informational purposes only. Specifications subject to change without notice.

