

Fiber optic sensor for liquid detection



Article Overview

Fiber optic sensors detect liquid levels using light reflection and refraction, offering high accuracy, non-contact measurement, and suitability for harsh environments.

Working Principle

Fiber optic liquid level sensors operate based on total internal reflection. A fiber optic cable transmits light from a source to a receiver. When the light encounters a boundary between the fiber core and cladding, a portion of it escapes depending on whether the fiber is in contact with a liquid. This change in light intensity is measured to determine the liquid level. Some advanced systems use wavelength and intensity multiplexing (IWDM) to monitor multiple points with a single sensor, enhancing accuracy and reducing costs .

Advantages

- **Non-contact Measurement:** Eliminates corrosion, contamination, and mechanical wear, making them ideal for hazardous or corrosive liquids .
- **High Accuracy and Precision:** Capable of detecting small changes in liquid levels with high repeatability .
- **Temperature and Environmental Resistance:** Can operate reliably in extreme temperatures and harsh industrial conditions, including oil, gas, and chemical processes .
- **Flexibility and Compactness:** Small size allows installation in confined spaces and integration into existing systems .
- **Low Maintenance:** No moving parts reduce downtime and maintenance costs

Article Content

Dec 31, 2025

Fiber optic sensors for liquid level measurement

The large number types of sensors with the various principles have been used for the liquid level measurement.

Oct 09, 2025

Fiber optic sensors and fiber optics | Baumer USA

Fiber optic sensors and fiber optics - limitless and customized The perfect solution with the fiber optics sensor toolbox Over 350

Apr 10, 2026

Fiber-Optic Liquid Level Sensor

A fiber-optic liquid level sensor based on multimode interference (MMI) effects is proposed and demonstrated. We

Aug 05, 2025

(PDF) All-fiber-optic sensor for liquid level measurement

An experimental realization of a simple all-fiber-optic sensor for liquid level measurement is demonstrated. It is an

Mar 31, 2026

A facile optical sensor: Plastic optical fiber voids as a liquid level ...

Optical sensors use light to detect or monitor different phenomena. Plastic optical fibers (POFs) have larger core

Jan 13, 2026

Plastic fiber optic sensor for continuous liquid level monitoring

In addition, the fiber optic level sensor shows a stable and reproducible response over several cycles of 30 min

May 12, 2026

Portable Optical Fiber Sensor for Continuous Liquid Level Sensing

This article presents a portable optical fiber sensor (OFS) design for continuous liquid level measurement, fabricated using two

Dec 11, 2025

High-precision fiber optic liquid level sensor based on fast Fourier ...

Abstract This study presents a fiber optic liquid level sensor (FOLLS) by acquiring information from the amplitude of

Sep 28, 2025

Liquid-level-detection Fiber Unit

Liquid-level-detection Fiber Unit FU-95Z *Please note that accessories depicted in the image are for illustrative purposes only and

Dec 10, 2025

Fiber Optic Liquid-Level Sensor System for Aerospace Applications

This chapter reports optical fiber-based sensors for liquid-level detection in aerospace environment. It discusses preliminary

Sep 09, 2025

(PDF) Fiber Optic Liquid Level Sensor Based on ...

Schematics of fiber optic liquid level sensor system based on a combination of optical interferometry and leverage

Dec 25, 2025

(PDF) Fiber optic sensors for liquid level measurement

Fiber optic sensors are being widely used in digital applications for switches and counters. Applications are expanding

Jan 21, 2026

Anti-Crosstalk Fiber-Optic Liquid Level Sensor Based on Hollow-Core ...

In this letter, we develop a novel fiber-optic sensor based on a hollow-core Bragg fiber (HCBF) for high-precision detection of liquid

Mar 08, 2026

Fiber optic SPR sensor for liquid concentration measurement

A liquid concentration measurement system with end-reflection optic fiber SPR sensor was set up. Then the

Jun 29, 2026

Design and operation of a fiber optic sensor for liquid level detection ...

Abstract Design and construction of an optical fiber sensor for liquid level detection are reported. This sensor operates

Oct 05, 2025

Microhole fiber-optic sensors for nanoliter liquid measurement

Microhole optical fiber sensors have the characteristics of simple structure, enclosed environment, strong light and

Nov 18, 2025

Highly sensitive optical fiber hydrogen detection in liquid environment ...

This indicates that the proposed sensor possesses the superior performance, making it suitable for highly sensitive

Sep 01, 2025

Liquid level sensor based on dynamic Fabry-Perot ...

In this work, a novel optical fiber sensor capable of measuring both the liquid level and its refractive index is designed,

Dec 19, 2025

Real-time Liquid Level Measurement using a Plastic Optical Fiber

Abstract. This research presents a low-cost sensor for measuring liquid levels using plastic optical fibers (POF). The

Sep 02, 2025

Fiber-optic liquid-level sensor

An intensity-based fiber-optic liquid-level sensor for point measurement is described. The sensing principle is based

Apr 27, 2026

Fiber optical liquid level sensor under cryogenic environment

This paper reports a preliminary experimental investigation and characterization of an optical fiber-based liquid level

Dec 30, 2025

High-Resolution Portable Dual-Point Liquid Level Measurement

This paper presents a portable dual-point optical fiber sensor system for continuous liquid level measurement using polymer optical

Jan 15, 2026

Optical Fiber Sensing for Sub-Millimeter Liquid-Level Monitoring: A ...

Fiber optic-based liquid-level sensors (FOLLSs) can work in harsh environments with inherent advantageous features

Jul 06, 2026

Polymer Optical Fiber Liquid Level Sensor: A Review

Polymer optical fiber (POF) level sensors have a lot of potential in liquid level sensing because of their inherent safety,

Sep 26, 2025

High Accuracy and Cost-Effective Fiber Optic Liquid Level ...

In circumstances that needed contactless liquid level sensing, radio frequency radar-based sensors were considered

Mar 29, 2026

Low-pressure and liquid level fiber-optic sensor based on polymeric ...

An experimental study of the interaction between a Mylar® polymer film and a multimode fiber-optic is presented for

Oct 15, 2025

Exploring Fiber Optic Liquid Level Sensors: High-Speed and

Fiber optic liquid level sensors offer exceptional response times, making them well-suited for high-speed applications.

Apr 28, 2026

Distributed Fiber Optic Sensor for Accurate Liquid Level Monitoring ...

In this study, we propose a distributed fiber optic liquid level sensing system that overcomes these limitations by

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