

# Sensor Fiber Optic Tube



## Overview

A complete sensor consists of a base unit and a plastic or fiber tube to guide the light, depending on what the application requires.

## Key Takeaways

Fiber optic tubes guide light between a sensor and the target, enabling precise detection in compact or harsh environments.

## Overview

A fiber optic sensor system typically consists of a sensor (with a light source and receiver) and one or more fiber optic tubes that transmit light to and from the target object. The sensor emits light, which travels through the fiber optic tube to the object. Reflected or interrupted light is then returned through the fiber to the sensor, allowing detection of object presence, position, or properties.

## Types of Fiber Optic Tubes

### Plastic Fiber Optic Tubes



Made from materials like PMMA (polymethyl methacrylate) Lightweight, flexible, and bendable, suitable for tight spaces and dynamic bending applications Economical and ideal for visible light transmission Can handle small bending radii, sometimes as low as 1 mm Glass Fiber Optic Tubes Made from high-purity quartz glass Low signal attenuation, allowing long-distance light transmission Can transmit visible, infrared, and ultraviolet light Highly resistant to heat, chemicals, moisture, and UV radiation, suitable for harsh environments with temperatures over 200°C Applications Fiber optic tubes are used in scenarios where conventional sensors are too large or inflexible: Small part detection and positioning Robotics and automated assembly Harsh industrial environments with oil, chemicals, or extreme temperatures Tight or confined spaces where direct sensor mounting is impractical Sensor Integration Fiber optic tubes connect to a sensor amplifier, which contains the light source and processing electronics.

The tubes themselves carry no electronics, making them ideal for environments with high vibration, temperature extremes, or corrosive substances. Various tube shapes and heads (straight, angled, bendable, cylindrical, or square) allow precise light delivery and detection even in complex geometries.

### **Advanced Fiber Optic Sensing**

Some systems, like Sensuron's optical fiber sensors, use fiber optic tubes for distributed sensing, measuring strain, temperature, deflection, or shape along the entire fiber length. These systems can monitor thousands of points simultaneously, providing high-resolution, real-time data for structural or material analysis. Fiber optic tubes are therefore a versatile component in both standard object detection and advanced sensing applications, offering flexibility, durability, and precision.

## **Article Content**

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Fiber Optic Sensor Cables for Advanced Monitoring | AP Sensing

Fiber optic sensor cables are the key enabler for real-time monitoring of temperature, strain, and acoustic signals across diverse and challenging environments. Depending on the application and the

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 signals from a remote sensor to the electronics that process the signals

ITEST SFRC-310 Digital Fiber Optic Amplifier NPN Output 12-24VDC

Features 1.2mm small sensing head, stainless steel tube, Description Fiber Optical  
Sensor Viewing Angle 45° reflection detection angle Response Time

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