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Terminology of optical fibre sensing technology

光纤传感技术术语

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Foreword

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1.Structure and Drafting Rules of Standardization Documents". Drafting. Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed by the China Machinery Industry Federation. This document is under the jurisdiction of the National Technical Committee on Standardization of Optics and Photonics (SAC/TC103). This document was drafted by: Tianjin University, Shanghai University of Science and Technology, Xiamen Bige Technology Co., Ltd., and Tianjin Municipal Institute of Metrology and Testing. Institute, Shenzhen Institute for Drug Control (Shenzhen Medical Device Testing Center), Jiangxi Dasheng Plastic Fiber Optic Co., Ltd., Hebei University of Technology, Xiamen University, Shandong Xingran Information Technology Co., Ltd., Huazhong University of Science and Technology, Hebei University of Architecture and Engineering, Nanjing University, Qingdao Nuoke Communication Technology Co., Ltd. Technology Co., Ltd., Institute of Semiconductors, Chinese Academy of Sciences, CCCC First Harbor Engineering Survey and Design Institute Co., Ltd., Guangdong Fu'an Technology Development Co., Ltd. Limited Company, Chongqing University, Harbin Institute of Technology, Nanjing University of Posts and Telecommunications, Qingdao Huian Valley Technology Development Co., Ltd., Hebei Weitan Technology Co., Ltd. The company, Shijiazhuang Yizhong Electromechanical Technology Co., Ltd., Chongqing University of Technology, University of Electronic Science and Technology of China, Fudan University, Tianjin Municipal Public Security Bureau Science and Technology Information Center Chemical Engineering Corps, Precision Instruments (Tianjin) Technology Co., Ltd., and Tianjin Qiushi Feibo Technology Co., Ltd. The main drafters of this document are. Jiang Junfeng, Liu Tiegeng, Liu Kun, Wang Shuang, Zhang Xuedian, Li Xuyou, Li Yuanyao, Zheng Xiuyu, Wang Qiang, Liu Shuo, and Chen Qinnan. Huo Dianheng, Luo Wenguo, Sun Qizhen, Yu Wenbin, Zhang Xuping, Wang Lei, Zhang Wentao, Cao Shengmin, Jia Bo, Zhu Tao, Wang Guizhong, Zhang Yan, Li Bingxiang, Chen Xiaohong Zhou Suqin, Gao Wenbin, He

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Fiber optic sensing technology is a type of sensing method based on optical fiber media. Its core lies in utilizing the transmission characteristics of light in optical fibers to sense and measure data. It measures changes in external physical or chemical quantities. That is, incident light enters the sensor via an optical fiber, interacts with external matter within the sensor, and causes the light to change... Parameters such as intensity, wavelength, frequency, phase, and polarization state are modulated. The modulated optical signal is transmitted through optical fiber to an optoelectronic device, where it is demodulated. After adjustment, the measured parameters can be obtained. With the rapid development of science and technology both domestically and internationally, the fabrication process and performance level of optical fibers are constantly improving, and their application scope is expanding. The scope has expanded from basic physical quantity measurement to high-precision engineering inspection, medical diagnosis, and numerous scientific research fields. Traditional fiber optic sensing technology related standards... The existing standards are no longer sufficient to meet practical application needs, therefore it is urgent to revise the current standards and introduce new terminology and related definitions in line with the latest technological advancements. The aim is to promote the innovation and development of fiber optic sensing technology. Fiber optic sensing technology terminology

1 Scope

GB/T 47174-2026 is the Chinese national standard covering the vocabulary of fibre optic sensing - the point and distributed sensors, the Bragg grating, Raman, Brillouin and interferometric principles, and the terms for the quantities they measure along a fibre kilometres long. First edition, in force since 1 June 2026, and it is the reference for standards such as the buried heating pipe monitoring specification GB/T 47547-2026. It was issued on 27 February 2026 and has been in force since 1 June 2026, as a first edition. The document is under the responsibility of the China Machinery Industry Federation. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document defines the relevant terminology for fiber optic sensing technology. This document applies to the production, application, research, and other related technical fields of fiber optic sensing.

2 Normative references

This document has no normative references.

3 General Terms

3.1 The technology of using optical fiber as the transmission or sensing medium and utilizing optical properties to sense the parameters to be measured.

Note. It is divided into discrete fiber optic sensing technology and distributed fiber optic sensing technology.

3.2 optical fiber sensor A sensor that uses optical fibers to sense and/or transmit external parameters to be measured (physical quantities, geometric quantities, chemical quantities, etc.).

Note. The parameters to be measured are loaded onto the optical wave by modulating the parameters (wavelength, frequency, light intensity, phase, polarization, etc.) of the light wave transmitted in the optical fiber.

3.3 Fiber optic sensors (3.2) are composed of optical fibers as sensing elements.

3.4 Fiber optic sensors that use optical fiber only as a medium for optical transmission (3.2).

3.5 The optical signal modulated by the fiber optic sensor (3.2) is converted into an electrical signal, and the analysis of the measured parameter information is obtained through sampling and signal processing. Device.

3.6 The parameter to be measured is measured by one or more independent fiber optic sensors (3.2), and the fiber optic sensor signal is demodulated by the optical signal transmitted back through the fiber optic cable. Technology (3.1).

3.7 Spatially resolved measurements of the parameters to be measured are performed over an extended region using continuous optical fibers, and the optical signals transmitted back through the fibers are demodulated.