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Calibration Specification for Optical Fiber Bragg Grating Sensor Network Analyzers

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(English Translation)

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Introduction

JJF 1071-2010 "Rules for the Compilation of National Metrology and Calibration Specifications", JJF 1001-2011 "General Metrology Terms Language" and JJF 1059.1-2012 "Evaluation and Representation of Measurement Uncertainty" together constitute the Basic series of specifications.

This specification is released for the first time.

Calibration specification for Bragg fiber grating sensor network analyzer

1 Scope

This specification is applicable to the calibration of the Bragg fiber grating sensor network analyzer and other instruments that measure the Bragg fiber grating sensor signal.

2 Reference documents this specification refers to the following documents.

JJF 1199 "Calibration Specification for Optical Attenuator for Communication" for dated

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reference documents, only the dated version applies to this specification; for undated reference documents, the latest version (including all amendments) is applicable to this specification.

3 overview

Fiber Bragg grating sensors are used to monitor various dynamic or static signals such as temperature, strain, mechanical waves and other physical parameters.

Number of important sensors. Bragg fiber grating sensor network analyzer (also known as fiber grating sensor demodulator, the following is abbreviated Called "fiber grating sensor network analyzer") as the signal demodulation in high-performance Bragg fiber grating sensor system the main function of the unit is to monitor and analyze the central wavelength of the fiber grating and its variation.

Existing fiber grating sensor network analyzers are mainly divided into two categories. broadband light source type and swept frequency light source type.

The measurement principle of the broadband light source fiber grating sensor network analyzer is. the laser light emitted from the broadband light source passes through the ring the reflected light is output to the fiber grating, and the reflected light enters the detection and demodulation unit through the circulator, and then undergoes signal processing and finally displays the measurement results are shown. The schematic diagram of the measurement principle is shown in Figure 1.

Figure 1 Measurement principle diagram of broadband light source type fiber grating sensor network analyzer

The measurement principle of the swept-frequency light source fiber grating sensor network analyzer is to use a semiconductor amplifier module and a tunable filter.

The wave device is composed of a swept frequency light source, which concentrates the instantaneous energy to a single wavelength, and the wavelength is continuously tuned. The light source and detection use the same Frequency synchronization measurement. The return signal of the fiber grating is compared with the built-in etalon of the instrument to obtain the the wavelength value and the schematic diagram of the measurement principle are shown in Figure 2.

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