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GB/T 20485.33-2018

Methods for the calibration of vibration and shock transducers -- Part 33: Testing of magnetic field sensitivity

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Foreword

GB/T 20485 "Vibration and Shock Sensor Calibration Method" mainly consists of basic concepts, absolute calibration, comparison calibration, environmental simulation

It is composed of the other five categories, and the released parts are as follows.

--- Part 1. Basic concepts;

--- Part 11. Laser interference method vibration absolute calibration;

--- Part 12. Reciprocal method vibration absolute calibration;

--- Part 13. Absolute calibration of laser interference method;

---Part 15. Absolute calibration of angular vibration of laser interferometry;

--- Part 16. Calibration of the Earth Gravity Method;

--- Part 21. Vibration comparison method calibration;

--- Part 22. Impact comparison method calibration;

--- Part 31. Lateral vibration sensitivity test;

--- Part 33. Magnetic sensitivity test;

--- Part 41. Laser vibrometer calibration;

--- Part 42. Gravity acceleration calibration of high precision seismometers.

The parts that are planned to be released are.

--- Part 17. Absolute calibration by centrifuge method;

--- Part 32. Accelerometer frequency and phase response tests in response to test impulse excitation methods;

--- Part 43. Accelerometer calibration based on model parameter identification;

--- Part 44. Field vibration calibrator calibration;

--- Part 45. Vibration sensor calibration with built-in calibration coils.

This part is the 33rd part of GB/T 20485.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part replaces GB/T 13823.4-1992 "Magnetic sensitivity test for calibration method of vibration and shock sensors".

Compared with GB/T 13823.4-1992, the main technical differences between this part and the editorial modification are as follows.

--- Added description of measurement uncertainty assessment (see Chapter 4);

--- Added test procedures under computer control (see Appendix A);

--- Added a new three-orthogonal coil test method (see Appendix B).

This section uses the translation method equivalent to ISO 16063-33.2017 "Vibration and Shock Sensor Calibration Method Part 33. Magnetic Sensitive

Degree test.

This part is proposed and managed by the National Technical Committee for

Standardization of Mechanical Vibration, Shock and Condition Monitoring (SAC/TC53).

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1 Scope

This part of GB/T 20485 specifies the magnetic sensitivity test method for vibration and impact sensors, test procedures and instruments used for testing.

Technical indicator requirements. This section applies to all types of vibration and shock sensors.

The test magnetic field applied in this section is a sinusoidal alternating magnetic field with a frequency of 50 Hz (or 60 Hz) and a magnetic induction of more than 10-3 T (with

Effective value). A typical test magnetic field has a magnetic induction of 10-2 T (effective value) and a frequency of 50 Hz (or 60 Hz).

This section is mainly used for magnetic sensitivity testing under laboratory conditions.

Note. 1T=1Wb/m2.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions are appropriate for this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 20485.1-2008 Methods of calibration of vibration and shock sensors - Part 1. Basic concepts (ISO 16063-1.1998,

IDT)

3 Terms and definitions

The relevant terms of ISO and IEC apply to this document, and the database address is as follows.

4 Measurement uncertainty

Measurement uncertainty can be expressed in terms of relative extended uncertainty. If the measurement signal is large, the signal-to-noise ratio (SNR) is greater than 20 dB, the

surrounding ring

The effects of ambient vibration and instrument noise floor are negligible. The relative expansion uncertainty of this part is not more than 10% (including factor k=

2). If the measured signal is small, the signal-to-noise ratio SNR is lower than 20 dB, and the measurement uncertainty caused by ambient vibration and instrument noise floor is

The amount cannot be ignored. On the contrary, these components need to be carefully considered, because at this time it has become a major part of uncertainty.

All laboratories and users should evaluate the measurement uncertainty according to Appendix A of GB/T 20485.1-2008 to ensure the evaluation results.

Really credible. The measurement uncertainty is expressed in the form of extended uncertainty, including a factor k equal to 2 (or a probability of approximately 95%). make sure

It is the responsibility of the laboratory and the end user to assess the true uncertainty of the measurement uncertainty.

5.1 Overview

In order to make the sensor magnetic sensitivity test meet this part, especially to meet the measurement uncertainty requirements of Chapter 4, this chapter specifies the test.

The instruments used and their technical requirements.

5.2 Sensor magnetic sensitivity test device

The sensor magnetic sensitivity SB is the maximum output value XB,max of the magnetic effect of the sensor in the magnetic field and the magnetic induction intensity of the test magnetic field B.

Ratio (see 7.5). In order to get the sensor magnetic sensitivity SB, the test should.

--- Spatially, the test magnetic field can pass through the sensor under test at any different angle;

--- respectively measure the corresponding output value of the sensor at these angular positions;

--- Compare these output values to find the maximum output value XB, max;

--- According to the formula (2) of 7.5, the magnetic sensitivity of the sensor is obtained.

The sensor magnetic sensitivity test device is specially made to meet the above requirements, and its structure is shown in Figure 1.

Description.