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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 20485.21-2007

Replacing GB/T 13823.3-1992

**Methods for the calibration of vibration and shock transducers
-- Part 21: Vibration calibration by comparison to a reference
transducer**

振动与冲击传感器校准方法 第21部分：振动比较法校准
(English Translation)

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References

Foreword

GB/T 20485 "calibration of vibration and shock sensor" composed by the following categories.

--- Category 1. Basic Concepts;

--- Category 2. Absolute calibration methods (such as. vibration absolute laser interferometry method, vibration reciprocity law, the impact of absolute laser interferometry method, etc.);

--- Class 3. calibration by comparison (eg. vibration comparison, the impact of comparative law);

--- Category 4. Environmental analog calibration (eg. magnetic sensitivity, sound sensitivity, the base strain sensitivity, transverse vibration sensitivity, etc.);

--- Class 5. other.

This part of GB/T 20485 Class 3 in a section.

This part identical with ISO 16063-21:2003 (E) "calibration of vibration and shock transducers - Part 21. Vibration Comparative Law Calibration "(in English), and made editorial changes.

This part is the calibration method GB/T 13823.3-1992 "vibration and shock sensor calibration by sinusoidal excitation comparison (secondary school Quasi) "amendments. And GB/T 13823.3-1992 compared to major changes. The main changes are.

--- Calibrated frequency range (20Hz ~ 5kHz) extend (0.4Hz ~ 10kHz) (optional). Dynamic range (10m/s² ~ 1000m/s²) extended to (0.1m/s² ~ 1000m/s²) (optional).

Calibration of the vibration waveform --- expanded from single to multi-sine sine, random wave, and increased spectral analysis section.

--- Calibration frequency may be more, it can be a single point.

--- Calibration frequency is selected from the 1 1/3 octave to octave.

--- Press the test conditions and calibration uncertainty range of the calibration laboratory and field methods are divided into two categories.

--- Content from the calibration amplitude to amplitude and phase calibration (optional) calibration, the calibration from a single acceleration to acceleration, velocity and Displacement calibration.

--- The corresponding adjustment of calibration equipment, and increased requirements for the sensor installation conditions.

--- Appendix A were large changes, uncertainty of vibration calibration by comparison of the analysis made to standardize the description. apart from There are also outside the sensitivity calibration uncertainty increases the uncertainty of the calibration phase.

--- Added Appendix B, Appendix C, Appendix D.

--- Appendix A, Appendix B are normative appendix, Appendix C, Appendix D are informative appendices.

--- Increased by reference.

Since the implementation of this section instead of GB/T 13823.3-1992.

This part of the National Standardization Technical Committee of mechanical vibration and shock and focal points.

Drafting this Part. Measurement and Testing Technology Research Institute, Hubei Province, China Institute of Metrology.

Introduction

GB/T 20485 series provides a calibration method for a vibration and shock sensor for calibration laboratory and field use.

This section refers to the user range is wide, including in technical evaluation and vibration environments Metrology mechanical vibration characteristics of human violence Technician exposed problems. The critical part of the application is to describe in detail uncertainty of measurement and evaluation, as well as vibration measurement error Difference between the estimation and calculation methods Uncertainty extension.

In particular, the provisions of this section is. by a reference or standard verification work (using a portable field calibrator) (which as defined in reference [2]) to a national or international standard vibration absolute traceability. This section provides user linear vibration sensor (there or no signal conditioning) calibration methods and procedures, which can be obtained in the frequency of vibration amplitude and phase range of 0.4Hz ~ 10kHz (Optional) complex sensitivity.

GB/T 20485.21-2007/ISO 16063-21:2003 Vibration and shock sensor calibration method Part 21. Vibration calibration by comparison

1 Scope

This section describes the calibration by comparison to the linear vibration sensor, although this part is described through absolute and a calibration method the reference sensor calibration method of direct comparison, the method can also be used to calibrate a calibration system between different levels.

This section describes in detail the vibration frequency range from 0.4Hz ~ 10kHz, using the comparative method calibration of linear vibration sensor A step of. It is mainly for use in laboratory conditions, the standard method of vibration measurements, the measurement uncertainty is relatively small. It also can Measuring field conditions, so that the measurement uncertainty may be larger.

All significant uncertainty sources will affect the calibration result, this section also gives a method of assessing the expanded uncertainty. It includes the use of A verification

standards for estimation of calibration uncertainty.

Should coincide with the reference sensor calibration section compares the environmental conditions of the present method of calibration.

Note: Under extreme environmental conditions do sensor calibration is included in other standards.

2 Normative references

The following documents contain provisions which, through reference GB/T 20485 in this section constitute provisions of this section. For dated references Documents, all subsequent amendments (not including errata content) or revisions do not apply to this section. However, according to the encouragement of part Research into whether the parties to the agreement to use the latest versions of these documents. For undated references, the latest version applies to this section.

GB/T 3240-1982 Acoustics acoustic measurement commonly used frequency GB/T 20485.1 vibration and shock sensor calibration methods - Part 1. Basic Concepts (ISO 16063-1:1998, IDT) the calibration method GB/T 20485.11-2006 vibration and shock transducers - Part 11. Primary vibration calibration absolute laser interferometry (ISO 16063-11:1999, IDT) JJF1059-1999 Evaluation and Expression of Uncertainty in Measurement (BIPM/IEC/IFCC/ISO/OIML/IUPAC, 1995, IDT) ISO 2041:1990 Vibration and shock vocabulary

3 Measurement Uncertainty

Users in accordance with section 3.1 of Appendix A of uncertainty estimates made to confirm the level of uncertainty (see Appendix D).

To meet the different needs of the establishment of measurement systems, two examples are given, and gives each establish a measurement system requirements and can be reached Uncertainty. 1 is a calibration under controlled conditions in cases of good laboratory, calibration device which can obtain higher accuracy. Example 2 is slightly Less than the maximum accuracy calibration requirements or to maintain alignment within a narrow tolerance range. These two examples throughout this section.

a) Example 1.

France has been absolutely calibrated reference sensor, and uncertainty can provide references. This calibration can be passed to a practical application with work standards. So, when the temperature calibration by comparison with the corresponding provisions and other conditions as described is controlled in a narrow allowed Range.

b) Example 2.

Without absolute calibration by the reference sensor, but it is traceable, which is defined in