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

GB/T 20485.13-2007

**Methods for the calibration of vibration and shock transducers
-- Part 13: Primary shock calibration by laser interferometry**

振动与冲击传感器校准方法 第13部分: 激光干涉法冲击绝对校准

(English Translation)

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Foreword

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

--- Category 1. Basic Concepts;

--- Category 2. Absolute calibration methods (such as. vibration calibration by laser interferometry, laser interferometry impact absolute calibration);

--- Class 3. calibration by comparison (eg. Vibration calibration by comparison, the impact of comparison calibration);

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

This part of GB/T 20485 "calibration of vibration and shock pick" category 2 in a section.

This part identical with ISO 16063-13:2001 "vibration and shock sensor calibration methods - Part 13. Shock absolute laser interferometry Calibration "(in English).

This section is equivalent translation ISO 16063-13:2001. For ease of use, this section made the following editorial changes.

--- The term "international standards in this section" to "this part."

--- Delete international standards foreword.

--- With a decimal point "." Instead of a comma as the decimal point ","

--- Of ISO 16063-13:2001 and other international standards referenced in our country have been adopted as a standard by our standards instead of the corresponding International standards, not by direct reference to international standards for our standards.

Appendix A of this section is normative appendix, Appendix B, Appendix C is informative appendix.

This part is proposed by the China Institute of Metrology.

This part of the National Standardization Technical Committee of Vibration and Shock machinery centralized.

Introduction

By definition, shock sensitivity S_{sh} by the accelerometer output and input peak acceleration peaks relationship to decide. S_{sh} is not a unique Amount, with the shock pulse duration of shock wave shape, frequency response correction by the sensor bandwidth, supporting Conditioning instrument signal varies.

Calculation of a point corresponding to a frequency reuse sensitivity can be determined linear accelerometer in the frequency domain. This section presents the computational complexity sensitivity S_n amplitude and phase shift $\Delta\phi$ data processing program, and then calculate the impact sensitivity S_{sh} (see Appendix C).

This section gives a method of movement of the time history of the measurement of absolute motion, fundamentally different from GB/T 20485.1 presentation Speed changing shock calibration method. Thus, the resulting shock sensitivity differs from the latter resulting impact calibration factor, but, and ISO 5347-4 (the Converted to ISO 16063-22) consistent with the obtained calibration factor.

GB/T 20485.13-2007/ISO 16063-13:2001 Vibration and shock sensor calibration method Part 13. Shock calibration by laser interferometry

1 Scope

This section provides a laser interference to measure the impact of process time - displacement signal linear accelerometers impact absolute calibration method Equipment and operating procedures. This method is suitable shock pulse duration in the range of 0.05ms ~ 10ms, peak in the range of 102m/s² ~ 105m/s² (and related pulse duration), given the impact sensitivity.

2 Normative references

The following documents contain provisions which, through reference GB/T 20485 in this section constitute provisions of this section. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section. However, under this part are encouraged to reach Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 20485.1 vibration and shock sensor calibration methods - Part 1. Basic Concepts (ISO 16063-1:1998, IDT) GB/T 20485.11-2006 vibration and shock sensor calibration methods - Part 11. vibration calibration by laser interferometry (ISO 16063-11:1999, IDT) ISO 5347-22:1997 Vibration and shock sensor calibration methods - Part 22. Accelerometer resonance testing - General method

3 Measurement Uncertainty

Shock sensitivity measurement uncertainty.

--- In setting the reference peak acceleration 103m/s^2 , shock pulse duration of 2ms reference and reference gain amplifier for reading 1%;

--- All peak shock, pulse duration, not exceeding 2% of reading.

Above provisions apply to high-precision calibration level sensor (for example, the reference standard accelerometer), so that the operation should be carefully calibrated to ensure that all uncertainty components should be small enough to give security to comply with relevant regulations (see Appendix uncertainty component A). Especially from the sensor Intrinsic mode excitation spectral energy or shock machine should be higher than the spectral energy within the calibration frequency range is much smaller, the natural frequency of the sensor Tested in accordance with ISO 5347-22:1997 carried out. It should generally be avoided in Chapter 1, Chapter 6, the pulse given relatively short duration.

All users of this section shall prepare the actual uncertainty subscale in accordance with Appendix A.

Note: According to GB/T 20485.1, the measurement uncertainty is expressed as expanded uncertainty of measurement (the uncertainty).

4.1 General

In order to meet Chapter 1 measuring range and reach Chapter 3 uncertainty requirements of this chapter gives the recommended instruments and equipment required Technical indicators.

4.2 Based on the anvil body (rigid) movement of the impactor

The impactor is a hammer (elastomer) can move freely to a crash accelerometer mounted anvil body (target). After the hammer striking the anvil body, Linear Acceleration anvil body freely, while the hammer is locked automatically. In order to obtain the desired pulse width and pulse waveforms between the hammer and the anvil should be installed Steel spring or cushion (made of rubber, paper and some material may be made to achieve a pulse waveform), resulting impulse should be an approximate half-sine, Half-sine squared or Gaussian (Gaussian) acceleration waveforms. Hammer and anvil resonance frequency of at least $10/T$, T is the pulse duration.

GB/T 20485.13-2007/ISO 16063-13:2001