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

GB/T 20485.12-2008

Replacing GB/T 13823.18-1997

**Methods for the calibration of vibration and shock transducers
-- Part 12: Primary vibration calibration by the reciprocity
method**

振动与冲击传感器校准方法 第12部分：互易法振动绝对校准
(English Translation)

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Foreword

GB/T 20485 "vibration and shock sensor calibration method" is expected from the basic concept of the structure, the absolute calibration method, comparative method calibration and the environment Analog calibration and other categories as well as the following components.

- Part 1. Basic Concepts;
- Part 11. vibration calibration by laser interferometry;
- Part 12. Primary vibration calibration by reciprocity;
- Shock calibration by laser interferometry;. --- Part 13
- Part 15. Laser interferometry angular vibration calibration;
- Part 21. Vibration calibration by comparison;
- Part 22. Shock calibration by comparison.

This part of GB/Part of 12 T 20485.

This part identical with ISO 16063-12:2002 "vibration and shock sensor calibration methods - Part 12. Vibration absolute reciprocity law school Accurate "(in English).

This section is equivalent translation ISO 16063-12:2002.

For ease of use, this section made the following editorial changes.

--- The term "international standards in this section" to "this Part";

--- Delete foreword international standards;

--- With a decimal point instead of a comma as the decimal point, ",";

--- Of ISO 16063-12:2002 and other international standards referenced, there is adopted as the equivalent of a standard, instead of using our standard Corresponding to international standards, is not tantamount to the adoption of a standard for the direct reference to international standards.

This Part replaces GB/T 13823.18-1997 "vibration and shock sensor calibration method of calibration by reciprocity method." Compared with GB/T 13823.18-1997, the main modifications are as follows.

--- Standard name "calibration by reciprocity method" to "vibration calibration by reciprocity method";

--- Original frequency range specified in the standard 40Hz ~ 1250Hz to 40Hz ~ 5000Hz, and equipment required to do the phase it should be adjusted;

--- Calibration by the environmental conditions at room temperature $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ to $23\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$;

--- Choose calibration frequency is changed in accordance with the 1/3 octave;

--- Increasing the sensitivity of the accelerometer complex convergence angle (phase shift) Calculation of content;

--- Appendix A uncertainty calculated using the new method;

Chapter 3 --- increased measurement uncertainty and Chapter 4 symbols;

--- Added A. Appendix A 1.2 and A. 2.2 Uncertainty complex sensitivity convergence angle (phase shift) calibration calculations;

--- Added Appendix B reciprocity law theory in the electromechanical sensor calibration.

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

This part of the National mechanical vibration, shock and condition monitoring Standardization Technical Committee and centralized.

This section drafted by. China Institute of Metrology, Anhui University.

1 Scope

This section provides the use of reciprocity method and SI units for absolute calibration of accelerometers used equipment and operating procedures.

This section applies to the frequency range of 40Hz ~ 5kHz, linear acceleration amplitude (depending on frequency) range 10m/s² ~ 100m/s² of Accelerometer calibration, this section based on electrodynamic vibration coil is used as the reciprocal of the sensor.

Signal Conditioning with the instrument or amplifier is supporting the use of sensors school with good characteristics, you can use the method described in this section were Sensor Calibration. In order to achieve the measurement uncertainty of the provisions of this section of Chapter 3, it should be used with the sensor signal analyzer or put Conditioning Amplifier matching calibration (in this section, the combination of sensor and signal Conditioning instrument or amplifier is referred to as "accelerometer").

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 20485.1-2008 vibration and shock sensor calibration methods - Part 1. Basic Concepts (ISO 16063-1:1998, IDT) ISO 266 Acoustics preferred frequency

3 Measurement Uncertainty

In 160Hz reference frequency and reference amplitude 100m/s², 50m/s², 20m/s², 10m/s², the complex sensor sensitivity mode (web Uncertainty value) measuring not more than 0.5%, the argument (phase shift) Measurement uncertainty is not greater than 1 °, the frequency and amplitude of the entire calibration range Inner circle, amplitude measurement uncertainty of the sensitivity of less than 1%, the sensitivity of phase shift measurement uncertainty is not greater than 2 °.

It requires all users to be part of this uncertainty estimate according to Annex A, provide documentation of the measurement uncertainty.

According to GB/T 20485.1-2008, measurement uncertainty in the measurement of the expanded uncertainty (referred to as "uncertainty").

4 Symbol

Table 1 shows the general symbols used in this part. For special symbols used in the formula, the formula below was carried out

definition.

Table 1 Common symbols

Symbol	Definition	Units	Shaped test mass ordinal number (like = 0 means no mass)	M1 n
number of quality test masses like kg	U	complex voltage	V	U
complex admittance	S	GB/T 20485.12-2008/ISO 16063-12:2002		