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**INDUSTRY STANDARD OF THE
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**Calibration Specification for Linear Accelerometers at Ultra-low
Frequency and Ultra-low Level Acceleration
(English Translation)**

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Table of Contents

Introduction (II)	
1 Scope (1)	
2 References (1)	
3 Terms and measurement units (1)	
4 Overview (1)	
4.1 Accelerometer working principle (1)	
4.2 Accelerometer frequency response calibration principle (2)	
5 Metrology (2)	
5.1 Sensitivity Amplitude (2)	
5.2 Sensitivity Frequency Response (2)	
5.3 Sensitivity Linearity (3)	
5.4 Dynamic Range (3)	
5.5 Accelerometer dynamic threshold (3)	
5.6 Accelerometer dynamic resolution (3)	
6 Calibration conditions (3)	
6.1 School accelerometer (3)	
6.2 Calibration conditions (3)	
6.3 Measurement standards and equipment (3)	
6.4 Selection of calibration parameters (4)	
6.5 Other requirements (4)	
7 Calibration Items and Calibration Methods (4)	
7.1 Reference Sensitivity Amplitude and Phase Shift Calibration (4)	
7.2 Sensitivity Amplitude and Phase Frequency Response Calibration (5)	
7.3 Sensitivity Amplitude Linearity Calibration (5)	
7.4 Dynamic threshold calibration (5)	
7.5 Dynamic Resolution Calibration (5)	
8 Calibration Results (6)	
9 Time interval of correction (6)	
Appendix A Accelerometer sensitivity calibration method and data processing (mathematical method) (7)	
Appendix B Evaluation examples of acceleration sensitivity measurement uncertainty (9)	
Appendix C Ultra-low frequency micro-acceleration calibration device works (12)	

9 Time interval of correction (6)

Appendix A accelerometer sensitivity calibration method and data processing (mathematical method) (7)

Appendix B Evaluation examples of acceleration sensitivity measurement uncertainty (9)

Appendix C ultra-low frequency micro-acceleration calibration device works (12)

Introduction

Linear accelerometers have a frequency response from low to direct current, the frequency range and acceleration amplitude range of existing national standards Wai can not cover the line frequency response bandwidth of the accelerometer. This specification, combined with the actual situation of linear accelerometer calibration, refers to the United States Institute of Electrical and Electronic Engineers in its organization established IEEEStd836-2009 "IEEE recommended line accelerometer Precision Centrifuge Test Specification "," Appendix E in the low-frequency range to determine the accelerometer transfer function "section prepared.

Ultra-low frequency micro-acceleration linear accelerometer calibration specification

1 Scope

This specification specifies the linear accelerometer (hereinafter referred to as the accelerometer) in the ultra-low frequency (lower limit to 0.001Hz), micro Acceleration (lower limit to $5 \times 10^{-7} \text{m/s}^2$) conditions of the calibration items and calibration methods.

2 reference documents this specification cites the following documents.

JJG233-2008 piezoelectric accelerometer Vibration, impact, speed measurement terms and definitions Inertial technical terms GJB1037A-2004 Single Shaft Servo Acceleration Accelerometer Test Method IEEE Recommended Linear Accelerometer Precision Centrifuge Test Specification for dated references, only the dated version applies to this specification; for undated references the latest version (including amendments) applies to this specification.

3 Terms and measurement units 3.1 ultra-low frequency the range is from quasi-static 0.001Hz to low frequency vibration 0.1Hz.

3.2 micro-acceleration ultra-lowLevelacceleration Acceleration in the range of $5 \times 10^{-7} \text{m/s}^2$ to $1 \times 10^{-2} \text{m/s}^2$.

3.3 Mathematical swing (virtual) simpleharmonicpendulum-vibrationgenerator Mathematical swing table refers to the use of arc-shaped guide rail in the vertical plane virtual large radius of curvature of the pendulum movement platform.

3.4 with tilt shaft speedtable ratetablewithtiltedaxisofrotation with a turntable capable of tilting the rotary table.

4 Overview

4.1 accelerometer working principle Accelerometer mainly by the equivalent test quality, conversion components and circuits and mounting base and other components. When the accelerometer goes along when the measured object is moving, the quality of detection is affected by the inertial force generated by the acceleration of the outside world. The conversion element generates a signal corresponding to the input plus Speed proportional to the output signal.

The mechanical model of a typical accelerometer approximates the typical second-order mechanical model of mass, spring, and damping system.

$\frac{d^2x}{dt^2} + c \frac{dx}{dt} + kx = -ma$

In the formula.

m --- equivalent test quality, kg;