



# **IEEE Standard Specification Format Guide and Test Procedure for Linear, Single-Axis, Nongyroscopic Accelerometers**

## **Corrigendum 1: Changes to Annex K and Annex L**

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### **IEEE Aerospace and Electronic Systems Society**

Sponsored by the  
Gyro and Accelerometer Panel

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**IEEE Aerospace and Electronic Systems Society**

Approved 26 September 2008  
**IEEE-SA Standards Board**

**Abstract:** Specification and test requirements for linear, single-axis, nongyroscopic accelerometers for use as a sensor in attitude control systems, linear displacement measuring systems, and linear rate measuring systems are defined. The specification format guide and test procedure standard applies to force-rebalance accelerometers (pendulous or translational proof mass), vibrating beam accelerometers (VBAs), and micromechanical accelerometers that range from lesser accuracy to high accuracy devices.

**Keywords:** accelerometers, force-rebalance mode, inertial instrument, inertial sensor, MEMS, MEMS gyro, micro-electro-mechanical system, nongyroscopic accelerometers, open loop mode, ratiometric output, VBA

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## Introduction

|                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This introduction is not part of IEEE Std 1293-1998/Cor1-2008, IEEE Standard Specification Format Guide and Test Procedure for Linear, Single-Axis, Nongyroscopic Accelerometers, Corrigendum 1: Changes to Annex K and Annex L. |
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This is the first corrigendum to IEEE Std 1293™-1998.

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NOTE—The editing instructions contained in this corrigendum define how to merge the material contained therein into the existing base standard and its amendments to form the comprehensive standard.

The editing instructions are shown in ***bold italic***. Four editing instructions are used: change, delete, insert, and replace. ***Change*** is used to make corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using ~~strike through~~ (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make changes in figures or equations by removing the existing figure or equation and replacing it with a new one. Editing instructions, change markings, and this NOTE will not be carried over into future editions because the changes will be incorporated into the base standard.

## **Annex K**

**(informative)**

### **Calibrating accelerometer model coefficients from static multipoint tumble data**

#### **K.6 Least-squares maximum likelihood estimation**

##### **K.6.6 Covariance of parameter estimates**

*Replace Equation (K.51) in K.6.6 with the following equation:*

$$\sigma_{ik} \geq \left(A^{-1}\right)_{ik} \times (\text{residual rms})^2 \quad (\text{K.51})$$

## **Annex L**

**(informative)**

### **Vibration test equipment, test procedures, and analysis techniques**

#### **L.6 Calibration of nonlinear coefficients from vibration along different instrument axes**

##### **L.6.2 Calibration with vertical and horizontal electrodynamic vibrations**

#### L.6.2.4 Test results

*Replace Equation (L.5) in L.6.2.4 with the following equation:*

$$K_2 = \frac{1}{K_1} \frac{(E_{C1}^* + E_{C2}^*)}{A^2}$$

$$K_3 = \frac{1}{K_1} \frac{(E_{C1}^* - E_{C2}^*)}{3A^2}$$

$$K_{pp} = \frac{2}{K_1} \frac{E_{C3}^*}{A^2}$$

$$K_{oo} = \frac{2}{K_1} \frac{E_{C4}^*}{A^2}$$

$$K_{ip} \approx \frac{2}{K_1} \frac{(E_{C5}^* - E_{C3}^* - E_{C1}^*)}{A^2}$$

$$K_{io} \approx \frac{2}{K_1} \frac{(E_{C6}^* - E_{C4}^* - E_{C1}^*)}{A^2}$$

(L.5)

*Change the entry in the third column of the third row designated by “C2” of Table L.1 by replacing the existing equation with the following equation:*

$$(\overline{E_{C2}}) = K_1 \left( \text{Bias}_{C2} + K_2 \frac{A^2}{2} - K_3 \frac{3A^2}{2} \right)$$