

INTERNATIONAL
STANDARD

ISO
5347-16

First edition
1993-12-15

**Methods for the calibration of vibration
and shock pick-ups —**

Part 16:

Testing of mounting torque sensitivity.

*Méthodes pour l'étalonnage de capteurs de vibrations et de chocs —
Partie 16: Essai de sensibilité de couple de serrage*



Reference number
ISO 5347-16:1993(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 5347-16 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Sub-Committee SC 3, *Use and calibration of vibration and shock measuring instruments*.

ISO 5347 consists of the following parts, under the general title *Methods for the calibration of vibration and shock pick-ups*:

- Part 0: *Basic concepts*
- Part 1: *Primary vibration calibration by laser interferometry*
- Part 2: *Primary shock calibration by light cutting*
- Part 3: *Secondary vibration calibration*
- Part 4: *Secondary shock calibration*
- Part 5: *Calibration by Earth's gravitation*
- Part 6: *Primary vibration calibration at low frequencies*
- Part 7: *Primary calibration by centrifuge*
- Part 8: *Primary calibration by dual centrifuge*

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International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

- Part 9: Secondary vibration calibration by comparison of phase angles
- Part 10: Primary calibration by high-impact shocks
- Part 11: Testing of transverse vibration sensitivity
- Part 12: Testing of transverse shock sensitivity
- Part 13: Testing of base strain sensitivity
- Part 14: Resonance frequency testing of undamped accelerometers on a steel block
- Part 15: Testing of acoustic sensitivity
- Part 16: Testing of mounting torque sensitivity
- Part 17: Testing of fixed temperature sensitivity
- Part 18: Testing of transient temperature sensitivity
- Part 19: Testing of magnetic field sensitivity
- Part 20: Primary vibration calibration by the reciprocity method

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Methods for the calibration of vibration and shock pick-ups —

Part 16: Testing of mounting torque sensitivity

1 Scope

ISO 5347 comprises a series of documents dealing with methods for the calibration of vibration and shock pick-ups.

This part of ISO 5347 lays down detailed specifications for the instrumentation and procedure to be used for mounting torque sensitivity testing. It applies to pick-ups that are mounted by screws, bolts or other threaded fasteners. The change in calibration factor due to the mounting torque is determined.

This part of ISO 5347 is applicable for a mounting torque range of one-half of the specified value, the specified value and twice the value of the specified mounting torque.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 5347. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 5347 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5347-3:1993, *Methods for the calibration of vibration and shock pick-ups — Part 3: Secondary vibration calibration*.

3 Apparatus

3.1 Equipment capable of maintaining room temperature at $23\text{ °C} \pm 3\text{ °C}$.

3.2 Vibration equipment, complying with the requirements specified for secondary vibration calibration (see ISO 5347-3).

The thickness of the steel fixture on which the pick-up is to be mounted shall be at least three times the length of the mounting screws, with a minimum plate thickness of 20 mm.

The surface of the fixture shall have a roughness value, expressed as the arithmetical mean deviation, R_a , $< 1\text{ }\mu\text{m}$.

The flatness shall be such that the surface shall be contained between two parallel planes $5\text{ }\mu\text{m}$ apart.

The drilled and tapped holes for connecting the pick-up shall have a perpendicularity tolerance to the surface of less than $10\text{ }\mu\text{m}$, i.e. the centreline of the hole shall be contained in a cylindrical zone of $10\text{ }\mu\text{m}$ diameter and a height equal to the hole depth.

3.3 Torque-measuring equipment, giving a maximum total mounting torque error $< \pm 15\%$ of reading.

4 Method

4.1 Test procedure

The interface and thread lubrication normally recommended shall be used and stated. The torque shall be applied from zero torque to each of the three test torques (see clause 1) in one continuous procedure.

Determine the calibration factor for the reference frequency and the reference amplitude for the three test torques.

4.2 Expression of results

Calculate the torque sensitivity, S_T , expressed as a percentage, using the following formula:

$$S_T = \frac{S_x - S}{S} \times 100$$

where

S_x is the calibration factor at one-half of or at twice the specified mounting torque;

S is the calibration factor at the specified mounting torque.

The maximum value for the torque sensitivity shall be reported.

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