INTERNATIONAL STANDARD

**ISO
5347-20**

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

Part 20:
Primary vibration calibration by the reciprocity method

Méthodes d'étalonnage des capteurs de vibrations et de chocs —

Partie 20: Étalonnage primaire de vibrations par méthode réciproque

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 5347-20 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee 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*

— *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: Vibration calibration by reciprocity method*

— *Part 21: Shock calibration by using laser doppler velocimeter*

— *Part 22: Accelerometer resonance testing — General methods*

Annex A forms an integral part of this part of ISO 5347.

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

Part 20:
Primary vibration calibration by the reciprocity method

1 Scope

This part of ISO 5347 specifies the instrumentation and procedure to be used for the primary calibration of accelerometers using the reciprocity method.

It applies to rectilinear accelerometers. The method is a calibration of the complete vibrator coil/accelerometer system. It is applicable over a frequency range from 40 Hz to 1 250 Hz and a dynamic range from 10 m/s^2 to 100 m/s^2 (frequency dependent).

The applicable limits of uncertainty are ± 1,0 % of the reading at the reference frequency (160 Hz or 80 Hz) and reference amplitude (100 m/s^2 or 10 m/s^2) and reference amplifier gain setting.

2 Symbols

Main symbol	Definition	Unit
f	frequency of vibration	Hz
M	mass of added weight	kg
n	number of weights (1 is the smallest)	—
Q	slope of plot (figure 3)	—
R	value of resistor	Ω
$\overline{S}$	sensitivity	V/(m·s^{-2})
$\overline{X}$	$\dfrac{\text{transducer output voltage}}{\text{open coil open voltage}}$	—
$\overline{Y}$	$\dfrac{\text{current through coil}[1]}{\text{transducer output voltage}}$	—
φ	phase	

1) Measured as volts.