

JIS

JAPANESE INDUSTRIAL STANDARD

**Mechanical Vibration of Rotating and
Reciprocating Machinery—Requirements
for Instruments for
Measuring Vibration Severity**

JIS B 0907—1989

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Mechanical Vibration of Rotating and Reciprocating Machinery - Requirements for Instruments for Measuring Vibration Severity B 0907-1989

1. Scope

This Japanese Industrial Standard states the requirements which a measuring instrument for vibration severity of machines should meet if inaccuracies of measurement, particularly when making comparisons between one machine and another, are not to exceed a specific value. Instruments meeting the requirements of this Standard are suitable for use in carrying out the procedures specified in ISO 2372 and JIS B 0906 and are designated "Measuring instruments for vibration severity in rotating and reciprocating machines".

The instruments covered by this Standard give direct indication or recording of root-mean-square vibration velocity, which is defined as the measuring unit of the vibration severity.

Remarks 1. A method of checking true root-mean-square (rms) indication is described in an Appendix.

2. Subject to limitation of the measuring-frequency range, these instruments may be used for other applications where similar accuracy of measurement is required, for example measurement of vibration velocity of structures, tunnels, bridges, etc.

2. Definitions

The terms used in this Standard are defined in the following IEC Publications and ISO International Standards:

IEC 184-Methods for specifying the characteristics of electromechanical transducers for shock and vibration measurements

IEC 222-Methods for specifying the characteristics of auxiliary equipment for shock and vibration measurements

ISO 2041-Vibration and shock - Vocabulary

ISO 2372-Mechanical vibration of machines with operating speeds from 10 to 200 rev/s - Basis for specifying evaluation standards

IEC 34-14-Rotating electrical machines.

Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of the vibration severity

Applicable Standard:

JIS B 0906-Mechanical Vibration of Machines with Operating Speeds from 10 to 200 r/s - Basis for Specifying Evaluation Standards

Corresponding International Standard:

ISO 2954-Mechanical vibration of rotating and reciprocating machinery - Requirements for instruments for measuring vibration severity

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3. General Requirements

A vibration measuring instrument usually consists of: a vibration pickup; an indicator set which contains an amplifier, correcting filter networks for the frequency response and an indicating or recording instrument; and a power supply system.

The requirements described in this clause apply to the general characteristics of the complete assembly of the pickup and the true Vrms indicator set. Clauses 4 and 5 contain the detailed requirements for each of these main units.

3.1 The frequency range of the vibration severity measuring instrument shall be from 10 to 1000 Hz.

Remark: This means that the frequency range corresponds to the frequency interval employed in the evaluation scale in JIS B 0906 (ISO 2372).

3.2 The sensitivity within the measuring-frequency range shall not deviate from the reference sensitivity at 80 Hz by more than the quantities given in the Table.

To minimize measurement errors caused by the interference due to vibrations with frequencies outside the measuring-frequency range, the sensitivity shall decrease rapidly in a clearly defined manner at the limits of the frequency range. Both the required nominal values of the sensitivity and the permissible minimum and maximum values are given in the Table.

To preclude doubts about the course of the sensitivity between the cutoff frequencies shown in the Table, Figure illustrates the course of the nominal value of the relative sensitivity and the limit of the permissible deviation within the whole frequency range from 1 to 10000 Hz.

Remark: In some cases it may be necessary to limit further the measuring-frequency range at its upper or lower boundaries to avoid interfering vibrations which are irrelevant to the assessment of the vibration characteristics of a machine. For this purpose the instrument may be equipped with additional high-pass or low-pass filters. It is recommended that the cutoff frequencies and edge steepness of these filters be selected in accordance with IEC specifications.

When the measuring-frequency range is narrowed down by additional filters, the measured value should not be used for assessing the vibration severity in accordance with JIS B 0906 and IEC 34-14. To avoid errors, it is necessary to state the cutoff frequencies for the measuring-frequency range as well as the measured value, for example Vrms (40 to 100 Hz) = 7.5 mm/s.

3.3 The selection of the measurement range shall be such that the indication of the lowest level of the vibration severity to be measured shall be equal to at least 30 % of the full-scale value. The minimum and maximum levels of the vibration severity range (for example in accordance with Table 1 of JIS B 0906 (ISO 2372)) shall be stated, for example "Measuring instrument for vibration severity with measurement range 0.28 to 28 mm/s".