IS 9302-9-2 (1980): Characteristics and methods of measurements for sound system equipment, Part 9: Programme level meters, Section 2: Peak programme meters, Type 1 [LITD 7: Audio, Video and Multimedia Systems and Equipment]

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IS : 9302 (Part IX/Sec 2) - 1980
(Reaffirmed 2001)

Indian Standard

CHARACTERISTICS AND METHODS OF MEASUREMENT FOR SOUND SYSTEM EQUIPMENT

PART IX PROGRAMME LEVEL METERS

Section 2 Peak Programme Meters, Type I

UDC 621·317·743:681·84

INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Rs 5·00

April 1981

Indian Standard

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CHARACTERISTICS AND METHODS OF MEASUREMENT FOR SOUND SYSTEM EQUIPMENT

PART IX PROGRAMME LEVEL METERS

Section 2 Peak Programme Meters, Type 1

0. FOREWORD

0.1 This Indian Standard (Part IX/Sec 2) was adopted by the Indian Standards Institution on 27 October 1980, after the draft finalized by the Acoustics Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 The purpose of this standard is to specify the characteristics and methods of measurement for peak programme meters, Type 1.

0.3 Different types of sound system equipment are to be covered in a series of standards consisting of the following individual parts:

Part I	General
Part II	Amplifiers
Part III	Microphones
Part IV	Loudspeakers
Part V	Auxiliary passive elements
Part VI	Headphones
Part VII	Automatic gain control devices
Part VIII	Artificial reverberation, time delay and frequency shift equipment
Part IX	Programme level meters
Part X	Preferred matching values for the interconnection of sound system components

0.4 Peak programme meters normally consist of two different parts.

0.4.1 The electronic unit, normally contains an amplifier, a rectifier, an integrating circuit and means for obtaining an approximately logarithmic relation between the peak (quasi) of the source emf and the resulting indication of the instrument connected to it.

0.4.2 The indicating instrument, has an approximately linear scale calibrated in decibels.

0.5 The peak programme meter is designed for directly measuring the quasipeak level of complex electrical waves occurring in the transmission of music or speech, that is, without varying the sensitivity of the device, to achieve, an optimum technical utilization of transmission channel or of the recording medium. For this purpose, a full-wave rectifier is used and the integration time is chosen so as to obtain an amplitude as high as possible without overloading the transmission link for a period long enough to give rise to audible non-linear distortion of the programme. The return time is relatively long in order to avoid unnecessary fatigue of the observer. As there are different kinds of peak programme meters, the dynamic characteristics cannot always be specified by a single figure.

0.6 The characteristics to be specified by the manufacturers are given in Appendix A.

0.7 While preparing this standard, assistance has been derived from IEC Pub 268-10:1976 'Sound system equipment:Part 10 Programme level meters' issued by International Electrotechnical Commission.

0.8 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS:2-1960*.

1. SCOPE

1.1 This standard (Part IX/Sec 2) specifies the characteristics and the methods of measurements for peak programme meters, Type 1.

2. TERMINOLOGY

2.1 For the purpose of this standard, the terms and definitions given in IS:9302 (Part IX/Sec 1)-1980† shall apply.

*Rules for rounding off numerical values (*revised*).

†Characteristics and methods of measurements for sound system equipment: Part IX Programme level meters, Section 1 General.

3. CONDITIONS FOR MEASUREMENT

3.1 Provision of **3** of IS:9302 (Part IX/Sec 1)-1980* shall apply.

4. TESTS

4.1 Provision of **4** of IS:9302 (Part IX/Sec 1)-1980* shall apply.

5. REQUIREMENTS

5.1 Reference Indication — An indication corresponding to the maximum permitted programme level on the circuit to which the meter is connected. This indication should normally be marked 0 on the decibel scale and may additionally be marked 100 on a percentage scale.

5.2 Reference Voltage — Unless otherwise specified, the reference voltage shall be 1·55 V.

5.3 Division of the Scale — The division of the scale should be approximately linear and calibrated in decibels. The scale should preferably cover at least the range from −40 dB to +3 dB.

NOTE — For certain purposes, for example, for line overloading control and portable use, meters with a smaller range of indication may be used.

5.4 Amplitude-Frequency Response — Within the effective frequency range, the deviations from the ideal 'flat' response shall be less than ±1 dB. Outside the effective frequency range, the response shall decrease smoothly. At 40 000 Hz, the indication should fall to at least 15 dB below the indication at 1 000 Hz.

5.5 Effective Frequency Range — The effective frequency range shall be 31·5 Hz to 16 000 Hz.

5.6 Dynamic Response — The dynamic response shall be in accordance with the following relations between burst durations and pointer deflections:

Burst Duration (ms)	*Deflection* (dB)	*Tolerance* (dB)
10	−1	± 0·5
5	−2	± 1
3	−4	± 1

NOTE — At the present time, instruments from different manufacturers show a great variety of indications at shorter burst durations and, consequently, no standard values can be given.

*Characteristics and methods of measurements for sound system equipment: Part IX Programme level meters, Section 1 General.

As a tentative value, an indication of -15 dB ± 4 dB for a tone burst duration of 0·4 ms is proposed. If the tone burst generator used does not have a triggering device that permits switching at zero crossing, a higher measuring frequency should be used.

In any case, the indication should decrease continuously with decreasing duration of the bursts.

5.7 Integration Time — The integration time shall be 5 ms, that is, a tone burst of 5 ms shall give a reading of -2 dB.

NOTE 1 — With some types of peak programme meters, the integration time is about twice as long. It should, however, be borne in mind that even with very short impulses, the indication will not differ by more than 3 dB if the integration time is doubled.

NOTE 2 — When repetitive tone bursts are applied, the indication should in no case exceed by more than 1 dB, the indication corresponding to a steady-state signal of the same amplitude as the tone bursts.

NOTE 3 — When the amplitudes of successive tone bursts having a constant duration of 5 ms are reduced progressively below reference voltage, the indication should decrease by directly proportional amounts over the scale range of the instrument.

5.8 Delay Time — The delay time shall be less than 300 ms.

5.9 Overswing — The overswing shall be not greater than 1 dB.

5.10 Return Time — The return time shall be $1{\cdot}7 \pm 0{\cdot}3$ seconds when the lower point is 20 dB below reference indication. The return speed (in decibels per second) should be approximately constant. On multiple instruments intended for monitoring multi-channel programmes, the difference in return time should be less than 0·1 second.

5.11 Reversibility Error — The difference in indication shall be not greater than 1 dB.

5.12 Input Impedance — The input impedance shall be higher than 10 kΩ.

NOTE — This condition need not necessarily be fulfilled if the meter is permanently built into an equipment and permanently connected to the source, and provided that the input impedance is practically constant within the frequency range.

5.13 Distortion Introduced By the Peak Programme Meter — The total non-linear distortion introduced by the meter into a source of 600 Ω impedance shall be less than 0·1 percent even if the supply voltage to the electronic unit is switched off.

5.14 Temperature Range — The indication corresponding to the reference voltage shall not change with temperature by more than 0·2 dB in the temperature range between +10°C and +50°C, or by more than 0·5 dB between 0°C and +10°C.

5.15 Overload Input Level — The overload input level shall be at least 20 dB above reference voltage for a time interval of 5 second, and at least 10 dB for an unlimited period of time.

5.16 Rated Equivalent Source emf For External Magnetic Field of Power Supply Frequency — The rated equivalent source emf shall be more than 50 dB below reference voltage at a field strength of 4 A/m and a frequency of 50 Hz. For meters which show no indication for a source emf of this level, a field strength of 4 A/m should give no visible indication.

5.17 Supply Voltage Range — For input voltage between reference voltage and 10 dB below reference voltage the corresponding indications shall not change with supply voltage by more than 0·5 dB with power supply deviations between −20 percent and +10 percent of the rated value.

APPENDIX A

(*Clause* 0.6)

CHARACTERISTICS TO BE SPECIFIED

A-1. INTRODUCTION

Characteristics to be specified shall be classified as:

A = data which shall always be marked by the manufacturer on the rating plate; and

B = data which shall always be specified by the manufacturer in the manual (descriptive leaflet) and technical specification.

If more than one cross is shown in the table, the data shall be given both on the rating plate and in the manual and technical specification.

A-2. CLASSIFICATION

Clause	Characteristics to be Specified	Classification	
		A	B
	SECTION THREE — PEAK PROGRAMME METERS, TYPE 1		
5.1	Reference indication		×
5.2	Reference voltage	×	×
5.3	Division of the scale		×
5.4	Amplitude-frequency response		×
5.5	Effective frequency range		×
5.6	Dynamic response		×
5.7	Integration time		×
5.8	Delay time		×
5.9	Overswing		×
5.10	Return time		×
5.11	Reversibility error		×
5.12	Input impedance		×
5.13	Distortion introduced by the peak programme meter		×
5.14	Temperature range		×
5.15	Overload input level		×
5.16	Rated equivalent source emf for external magnetic field of power supply frequency		×
5.17	Supply voltage range	×	×

INDIAN STANDARDS

ON

ACOUSTICS

IS:

1301-1958 Code of safety requirements for electric mains-operated audio amplifiers

1490-1959 Recommendations for minimum performance requirements of mains-operated public address amplifiers

1819-1961 Recommendations for general requirements of public address amplifiers

1881-1961 Code of practice for installation of indoor amplifying and sound distribution systems

1882-1962 Code of practice for outdoor Installation of public address system

1885 Electrotechnical vocabulary:

- (Part III/Sec 1)-1965 Physical acoustics
- (Part III/Sec 2)-1966 Acoustical and electro-acoustical systems
- (Part III/Sec 4)-1966 Sonics, ultrasonics and underwater acoustics
- (Part III/Sec 5)-1966 Speech and hearing
- (Part III/Sec 6)-1967 Acoustical instruments
- (Part III/Sec 7)-1978 Music
- (Part III/Sec 8)-1974 Architectural acoustics

2032 (Part XII)-1969 Graphical symbols used in electro-technology: Part XII Electro-acoustic transducers and recording and reproducing systems

2264-1963 Preferred frequencies for acoustical measurements

2382-1970 Recommended mounting dimensions of loudspeakers (*first revision*)

3028-1965 Methods of measurements of noise emitted by motor vehicles

3641-1976 Methods of measurement on hearing aids (*first revision*)

3931-1966 Sound level meters for the measurement of noise emitted by motor vehicles

3932-1966 Sound level meters for general purpose use

4242-1967 Method of measurement of acoustical noise emitted by ballasts for gaseous discharge lamps

4406-1967 General requirements for hearing aids

4482-1967 Hearing aids

4755-1968 Reference zero for calibration of puretone audiometers

4758-1968 Methods of measurement of noise emitted by machines

6098-1971 Methods of measurement of airborne noise emitted by rotating electrical machinery

6229-1971 Method of measurement of the real-ear attenuation of ear protectors at threshold

6964-1973 Octave, half-octave and third-octave band filters for analysis of sound and vibrations

7136-1973 Megaphones

7194-1973 Assessment of noise exposure during work for hearing conservation purposes

7709-1975 Standard hydrophone

7741 (Part I)-1975 Specification for loudspeakers: Part I General requirements and tests (*Superseding* IS:1031-1967)

7741 (Part II)-1975 Specification for loudspeakers: Part II Direct radiator moving coil loudspeakers (*Superseding* IS:1033-1967)

7741 (Part III)-1975 Specification for loudspeakers: Part III Pressure unit operated horn loudspeakers (*Superseding* IS:1032-1957)

7741 (Part IV)-1977 Specification for loudspeakers: Part IV Loudspeakers for community radio receivers (*Superseding* IS:1034-1957)

8146-1976 Method of measurement of reverberation time in auditoria

8159-1976 Scales and sizes for plotting frequency characteristics and polar diagrams

8225-1976 Method of measurement of absorption coefficients in a reverberation room

9098-1979 Pure tone audiometers

9167-1979 Ear protectors

9302 (Part I)-1979 Characteristics and methods of measurement for sound system equipment: Part I General

9302 (Part II)-1979 Characteristics and methods of measurement for sound system equipment: Part II Amplifiers (*Superseding* IS:1302-1958)

9302 (Part III)-1979 Characteristics and methods of measurement for sound system equipment: Part III Microphones (*Superseding* IS:2748-1964)