SLOVENSKI STANDARD
SIST EN 60524:2001

01-februar-2001

Uporovni enosmerni napetostni delilniki (IEC 60524:1975 + A1:1981)

Direct-current resistive volt ratio boxes

Gleichspannungs-Widerstandsleiter

Diviseurs de tension à résistances en courant continu à rapports fixes

Ta slovenski standard je istoveten z: **EN 60524:1993**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

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ENGLISH VERSION

Direct-current resistive volt ratio boxes
(IEC 524:1975 + A1:1981)

Diviseurs de tension à résistances en courant continu à rapports fixes
(CEI 524:1975 + A1:1981)

Gleichspannungs-Widerstandsteiler

(IEC 525:1975 + A1:1981)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

FOREWORD

At the request of 72 Technical Board, HD 614 S1:1992 (IEC 524:1975 + A1:1981) was submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard was approved by CENELEC as EN 60524 on 9 March 1993.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-03-01
- latest date of withdrawal of conflicting national standards	(dow)	-

ENDORSEMENT NOTICE

The text of the International Standard IEC 524:1975 and its amendment 1:1981 was approved by CENELEC as a European Standard without any modification.

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Diviseurs de tension à résistances en courant continu à rapports fixes

Direct-current resistive volt ratio boxes

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Sub-Committee 13B, Indicating Instruments, of IEC Technical Committee No. 13, Measuring Instruments.

Drafts were discussed at the meetings held in Toronto in 1972 and in Copenhagen in 1973. As a result of this latter meeting, the draft, document 13B(Central Office)45, was submitted to the National Committees for approval under the Six Months' Rule in June 1974.

The following countries voted explicitly in favour of publication:

Argentina	Netherlands
Austria	Poland
Belgium	Portugal
Brazil	Romania
Canada	South Africa (Republic of)
Denmark	Sweden
Finland	Switzerland
France	Turkey
Germany	Union of Soviet Socialist Republics
Hungary	United Kingdom
Israel	United States of America
Italy	Yugoslavia
Japan	

DIRECT-CURRENT RESISTIVE VOLT RATIO BOXES

1. Scope

This standard applies to d.c. resistive volt ratio boxes with fixed ratios and having a rated input voltage up to 1.5 kV and having a class index of 0.1 [1 000 ppM (parts per million)] or better.

This standard applies to all equipment which is built-in or is supplied by the manufacturer (or responsible supplier) as an essential part of the volt ratio box.

This standard does not apply to auxiliary equipment.

2. Terms and definitions

For the purposes of this standard, the following definitions apply:

2.1 *D.C. resistive volt ratio box (hereinafter designated "VRB")*

A device consisting of a resistive network with fixed ratios providing an output voltage equal to a predetermined fraction of an input voltage. Both input and output voltages are each between a pair of terminals.

A VRB may have one or several ratios. In the latter case, there can be several inputs (Figure 1a) or several outputs (Figure 1b).

Note. — It is often used to act as a range multiplier for a d.c. potentiometer.

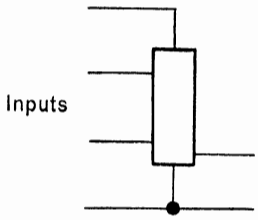

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FIGURE 1a

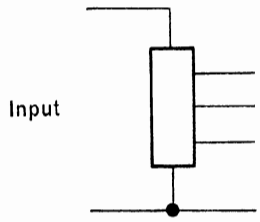

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FIGURE 1b

2.2 *Rated voltage(s)*

The value(s) of voltage which occur in the designation of the VRB.

2.3 *Nominal voltage ratio*

The ratio between the rated input voltage and the rated output voltage.

2.4 *True voltage ratio*

The ratio of the voltage applied to the input to the open circuit output voltage.

2.5 *Circuit insulation voltage (nominal circuit voltage)*

The highest voltage with respect to earth which may be applied to a circuit(s) of the VRB so that the VRB is unlikely to become dangerous to touch.

This is the voltage for which the VRB has been constructed from the point of view of insulation.

Note. — Auxiliary circuits (if any) may have a different value of circuit insulation voltage (nominal circuit voltage).

2.6 *Auxiliary equipment*

Additional equipment necessary to enable the VRB to operate accurately and safely and to be used to measure voltage.

2.7 *Leakage current screen (circuit)*

A conductive path which prevents leakage currents from affecting the results of measurements.

2.8 *Electrostatic screen*

An electrically conductive enclosure or coating intended to protect the enclosed space from external electrostatic influences.

2.9 *Ripple content*

The ripple content of a d.c. supply expressed as a percentage of the d.c. component is:

$$\frac{\text{r.m.s. voltage of the fluctuating component}}{\text{d.c. voltage}} \times 100$$

2.10 *Common mode voltage*

A voltage which exists between the common input-output terminal(s) and the earth terminal, the leakage current screen terminal or the electrostatic screen terminal, separately or collectively (as specified).

2.11 *Influence quantity*

A quantity which is liable to cause unwanted variation in the voltage ratio of a VRB.

2.12 *Variation with influence quantity*

The difference between two measured values for the same voltage ratio when an influence quantity assumes successively two different specified values.

2.13 *Reference conditions*

The specified conditions under which the VRB meets the requirements concerning intrinsic errors.

2.14 *Reference value*

A specified single value of an influence quantity at which, within the stated tolerance, the VRB meets the requirements concerning intrinsic errors.

2.15 *Reference range*

A specified range of values of an influence quantity within which the VRB meets the requirements concerning intrinsic errors.

2.16 *Nominal range of use*

A specified range of values which each influence quantity can assume without causing a variation exceeding the specified limits.

2.17 *Limiting values of an influence quantity*

Extreme values which an influence quantity may assume without the VRB being damaged or permanently altered in such a way that it no longer satisfies the requirements of its accuracy class.

2.18 *Fiducial value*

A value to which reference is made in order to specify the accuracy of the VRB.

The fiducial value for each ratio is the nominal voltage ratio.

2.19 *Error*

Value obtained by subtracting the true voltage ratio from the nominal voltage ratio.

2.20 *Error expressed as a proportion of the fiducial value*

Quotient of the error divided by the fiducial value.

It is expressed in percent or in ppM.

2.21 *Intrinsic error*

An error determined under reference conditions.

2.22 *Accuracy*

The accuracy of a VRB is defined by the limits of intrinsic error and the limits of variations due to influence quantities.

2.23 *Accuracy class*

A class of VRBs, the accuracy of all of which can be designated by the same number if they comply with all requirements of this standard.

2.24 *Class index*

The number which designates the accuracy class.

2.25 *Parasitic voltage*

The unwanted voltage which is present at the output terminals in the absence of or immediately after the removal of the input voltage.

Note. — It may be

— d.c. (due to thermo-electric, electro-chemical or similar causes);

— a.c. or impulsive (caused by, for example, auxiliary equipment).

3. Classification

VRBs specified in this standard are classified according to their accuracy classes as defined in Sub-clause 2.23 as:

a) 0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1

b) 1 ppM, 2 ppM, 5 ppM, 10 ppM, 20 ppM, 50 ppM, 100 ppM, 200 ppM, 500 ppM, 1 000 ppM.

The class index of a VRB may be expressed either in percent using *a)* or in ppM using *b)* or both.

4. Limits of intrinsic error

VRBs shall comply with the relevant limits of intrinsic error specified for their respective accuracy classes for the duration of one year from the date of certification associated with delivery or another date to be agreed upon by the manufacturer or responsible supplier and the user, provided that the conditions of use, transport and storage specified by the manufacturer are complied with.

Note. — For VRBs, stability of ratio with regard to time is an essential characteristic. Here, it is specified only for the duration of one year, but experience has shown that the rate of change of ratio due to ageing effects decreases with time.

4.1 *Permissible limits of intrinsic error*

When a VRB is under the reference conditions given in Table II, the intrinsic error shall not exceed the value given in Table I relating to its accuracy class.

TABLE I

Limits of intrinsic error expressed as a proportion of the fiducial value

%	Class index	0.0001	0.0002	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1
	Limit of error	± 0.0001	± 0.0002	± 0.0005	± 0.001	± 0.002	± 0.005	± 0.01	± 0.02	± 0.05	± 0.1
ppM	Class index	1	2	5	10	20	50	100	200	500	1 000
	Limit of error	± 1	± 2	± 5	± 10	± 20	± 50	± 100	± 200	± 500	± 1 000

4.2 *Multiple ratio VRBs*

VRBs with several selectable voltage ratios shall meet the requirements of Sub-clause 4.1 for all ratios.

Unless otherwise specified, all selectable voltage ratios shall have the same class index.

4.3 *D.C. parasitic voltages*

When a VRB is used at any rated voltage, the error caused by the d.c. parasitic voltage shall not exceed a value corresponding to 0.2 times the class index provided that it is operated in accordance with the manufacturer's instructions.

Note. — When the nature of the test is appropriate, the effect of a d.c. parasitic voltage may be reduced by reversing the polarity of the input voltage and by taking the average of the two measured values.

5. Conditions for the determination of intrinsic errors

5.1 The reference conditions relative to each of the influence quantities are shown in Table II.

5.2 Before any measurement, sufficient time shall elapse for the VRB to reach a stable state and to be in equilibrium with the reference values of the influence quantities.

TABLE II

Reference conditions and tolerances of the influence quantities

Influence quantity	Reference conditions unless otherwise indicated by the manufacturer	Class index		Tolerances permitted for testing purposes [1]
		%	ppM	
Ambient temperature	20 °C [2]	0.0001...0.001 0.002 ...0.01 0.02 ...0.1	1...10 20...100 200...1 000	± 0.5 °C ± 1°C ± 2 °C
Relative humidity	40% to 60%			
Position	Any			
Input voltage	Rated value	0.0001...0.1	1...1 000	± 1%
Ripple content of input voltage	Less than 0.1%			
Common mode voltage	Zero	0.0001...0.1	1...1 000	1% of the maximum specified d.c. common mode voltage

[1] For a reference range, no tolerance is allowed.

[2] If another temperature is indicated, it should be chosen from IEC Publication 160, i.e. 23 °C or 27 °C.