SLOVENSKI STANDARD
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Electrical relays - Part 3: Single input energizing quantity measuring relays with dependent or independent time

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iTeh STANDARD PREVIEW

Relais électriques - Troisième partie: Relais de mesure et dispositifs de protection à une seule grandeur d'alimentation d'entrée à temps dépendant ou indépendant

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Relais de mesure et dispositifs de protection
à une seule grandeur d'alimentation d'entrée
à temps dépendant ou indépendant

Electrical relays

Part 3:
Single input energizing quantity measuring relays
with dependent or independent time

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL RELAYS

Part 3: Single input energizing quantity measuring relays with dependent or independent time

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FOREWORD

1) The formal decisions or agreements of the I E C 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 I E C expresses the wish that all National Committees should adopt the text of the I E C recommendation for their national rules in so far as national conditions will permit. Any divergence between the I E C recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

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This standard has been prepared by Sub-Committee 41B: Measuring relays and protection equipment, of I E C Technical Committee No. 41: Electrical relays.

This second edition of I E C 255-3 replaces the first edition issued in 1971.

The text of this standard is based upon the following documents:

Six Months' Rule	Report on Voting
41B(CO)43	41B(CO)45

Full information on the voting for the approval of this standard can be found in the Voting Report indicated in the above table.

The following I E C publications are quoted in this standard:

Publications Nos.   50: International Electrotechnical Vocabulary (IEV).

255-6 (1988): Electrical relays, Part 6: Measuring relays with more than one input energizing quantity.

255-8 (1978): Part 8: Thermal electrical relays.

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ELECTRICAL RELAYS

Part 3: Single input energizing quantity measuring relays with dependent or independent time

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SECTION 1 – GENERAL

1. Scope and object

This standard is applicable to electrical measuring relays and protection equipment having a single input energizing quantity and where the operating time is independent or dependent on this quantity.

The object of this standard is to state the particular requirements for these relays.

It excludes thermal electrical relays which are specified in IEC 255-8 (1978), first edition.

These requirements supplement those specified in higher level documents of the 255 series.

2. Definitions

For definitions of general terms not defined in this standard, reference should be made to the International Electrotechnical Vocabulary (IEC 50), or to higher level documents.

For the purpose of this standard the following definitions shall apply:

2.1 *Theoretical curve of time/characteristic quantity* (see Figure 1)

Graphical representation of relationship between the theoretical specified operating times and the characteristic quantity.

2.2 *Curves of maximum and minimum limits of the operating time* (see Figure 1)

Curves of the limiting errors on either side of the theoretical time/characteristic quantity which identify the maximum and minimum operating times corresponding to each value of the characteristic quantity.

2.3 *Setting value of the characteristic quantity* (G_S) (see Figure 1)

The value of the input energizing quantity of the relay used as a reference for the definitions of the characteristic of dependent time relays with decreasing function.

Note. — The term G_S replaces the concept of basic value G_B which was previously used as a reference for defining the characteristics. As this was defined as the value for which the relay was required not to operate, it caused difficulties when considering the two types of relay described in 4.2.

2.4 *Threshold value of the characteristic quantity* (G_T) (see Figure 1)

The lowest value of the input quantity for which the relay just operates.

Note. — There are two general forms of dependent time relay with decreasing time function:

a) when the threshold value G_T lies between G_S and $1.3 \times G_S$ (see Figure 1a);

b) when the threshold value G_T is coincident with G_S (see Figure 1b).

2.5 *Overshoot time*

The overshoot time is the difference between the operating time of the relay at the specified value of the input energizing quantity and the maximum duration of the value of input energizing quantity which, when suddenly reduced to a specified value below the operating level, is insufficient to cause operation.

SECTION 2 — REQUIREMENTS

3. **Standard values**

3.1 *Standard values of dependent specified times*

There are no standard values of dependent specified times. The relationship between operating times and characteristic quantity can be expressed by means of a characteristic curve. The shape of this curve shall be declared by the manufacturer by an equation or by graphical means.

For dependent time relays with decreasing function the most common characteristic curves follow a law of the following form:

$$t = \frac{k}{\left(\dfrac{G}{G_S}\right)^a - 1}$$

where:

t = theoretical operating time (seconds)
k = constant characterizing the relay (seconds)
G = value of the characteristic quantity
G_S = setting value of the characteristic quantity (see 2.3)
a = index characterizing the algebraic function

Three classes of curves following the above general formula are as follows:

— type A   for $a \leqslant 0.5$
— type B   for $0.5 < a \leqslant 1.5$
— type C   for $a > 1.5$

For relays whose operating time conforms to the above family the manufacturer shall declare the values of a, k and G_S. The following are preferred values of a and k:

TABLE 1

	A	B	C
k	0.14	13.5	80.0
a	0.02	1.0	2.0

3.2 *Operative ranges of auxiliary energizing quantities*

The limits of the operative range for each auxiliary energizing quantity shall be as specified in National Standards or declared by the manufacturer.

3.3 *Values of resetting and disengaging ratios*

As specified in National Standards or declared by the manufacturer.

3.4 *Standard reference conditions and test tolerances of influencing quantities and factors*

Refer to table 2 below:

TABLE 2

	Influencing quantity or factor	Reference condition	Test tolerances
General	Position	As specified in National Standards or declared by the manufacturer	For static relays, as specified in National Standards or declared by the manufacturer
Characteristics and input energizing quantities	Input energizing voltage	As specified in National Standards or declared by the manufacturer	As specified in National Standards or declared by the manufacturer
	Input energizing current		
	D.C. transient component in a.c.		
	Setting value		
Auxiliary energizing quantities	Voltage or current	As specified in National Standards or declared by the manufacturer	As specified in National Standards or declared by the manufacturer
Time	Parameters of the characteristic curve	As specified in National Standards or declared by the manufacturer	As specified in National Standards or declared by the manufacturer
	Setting value		

3.5 *Standard values of the limits of the nominal ranges of influencing quantities and factors*

Refer to table 3 below:

TABLE 3

	Influencing quantity or factor	Nominal range
General	Relative humidity	As specified in National Standards or declared by the manufacturer
	Position	For static relays, as specified in National Standards or declared by the manufacturer
	External magnetic field	As specified in National Standards or declared by the manufacturer
Characteristics and input energizing quantities	Input energizing voltage	As specified in National Standards or declared by the manufacturer
	Input energizing current	
	Waveform	
	D.C. transient component in a.c.	
Time	Setting parameter(s) of the curve	As specified in National Standards or declared by the manufacturer
Auxiliary energizing quantities	Voltage or current	As specified in National Standards or declared by the manufacturer
	Frequency	
	Waveform	
	D.C. transient component in a.c.	

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4. **Accuracy**

4.1 *Accuracy relating to the characteristic quantity*

4.1.1 *Independent time relays*

For independent time relays the accuracy relating to the characteristic quantity shall be declared by the manufacturer.

4.1.2 *Dependent time relays*

a) For relays with decreasing time function of type A, B or C (see 3.1):

— either the minimum operating value G_T shall not be more than 1.3 times the setting value G_S,

— or the difference between the minimum operating value G_T and its setting value G_S shall not be greater than the assigned error stated by the manufacturer. This assigned error shall be chosen from the preferred values listed in 7.1.2 of the higher level document 255-6 (1988), second edition.

b) For relays with an increasing time function, as stated by the manufacturer.

4.2 *Effective range of characteristic quantity*

The concept of effective range of characteristic quantity is applicable to dependent time relays only.

a) For relays with decreasing time function, the effective range of characteristic quantity shall lie between 2 and 20 times the setting value G_S except where otherwise specified by the manufacturer.

b) For relays with an increasing time function, the effective range of characteristic quantity shall be specified by the manufacturer.

4.3 *Accuracy relating to time*

4.3.1 *Independent time relays*

For relays with an assigned error applicable to operating time, the maximum permissible error of the specified operating time shall be expressed as either:

a) a percentage of the reference time setting value, or

b) a percentage of the reference time setting value, together with a fixed maximum time error (where this may exceed the percentage value), whichever is the greater. For example ± 5% or 20 ms, or

c) a fixed maximum time error.

4.3.2 *Dependent time relays*

The reference limiting error is identified by an assigned error declared by the manufacturer, which may be multiplied by factors corresponding to different values of the characteristic quantity within its effective range.

For relays with a decreasing time function of type A, B or C, the value of the assigned error shall be declared at the maximum limit of the effective range as a percentage of the theoretical time.

The reference limiting error may be declared either as:

a) a theoretical curve of time plotted against multiples of the setting value of the characteristic quantity bounded by two curves representing maximum and minimum limits of the limiting error obtained under reference conditions (see Figures 1a and 1b), or