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Relais électriques

Douzième partie:

Relais directionnels et relais de puissance
à deux grandeurs d'alimentation d'entrée

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Electrical relays

SIST IEC 60255-12:1995

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Part 12:

Directional relays and power relays with
two input energizing quantities

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL RELAYS

Part 12: Directional relays and power relays with two input energizing quantities

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the 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.

iTeh STANDARD PREVIEW
 PREFACE
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This standard has been prepared by Sub-Committee 41B: Measuring Relays, of IEC Technical Committee No. 41: Electrical Relays.

Drafts were discussed at the meetings held in Nice in 1976 and in Milan in 1977. A draft, Document 41B(Central Office)10, was submitted to the National Committees for approval under the Six Months' Rule in May 1978.

The National Committees of the following countries voted explicitly in favour of publication:

Australia	Germany	Spain
Austria	Italy	Sweden
Belgium	Japan	Switzerland
Canada	Norway	Turkey
Egypt	Poland	United Kingdom
France	South Africa (Republic of)	United States of America

This standard, applicable to a particular group of measuring relays with more than one input energizing quantity, is hierarchically a third-level document: Standards applicable wholly or partly to a particular group of relays.

Other IEC publications quoted in this standard:

- Publications Nos. 50(131): International Electrotechnical Vocabulary, Chapter 131: Electric and Magnetic Circuits.
 255-0-20: Electrical Relays - Contact Performance of Electrical Relays.
 255-4: Single Input Energizing Quantity Measuring Relays with Dependent Specified Time.
 255-5: Electrical Relays, Part 5: Insulation Tests for Electrical Relays.
 255-6: Part 6: Measuring Relays with More than One Input Energizing Quantity.

ELECTRICAL RELAYS

Part 12: Directional relays and power relays with two input energizing quantities

SECTION ONE – SCOPE AND DEFINITIONS

1. Scope

This standard specifies the performance requirements of directional relays and power relays with two input energizing quantities, which constitute a particular sub-family of measuring relays with more than one input energizing quantity as defined in IEC Publication 255-6, Electrical Relays, Part 6: Measuring Relays with More than One Input Energizing Quantity, and the parameters whose values are to be declared by the manufacturer of such relays. It also specifies methods of presenting the characteristics and performance of these relays.

This standard excludes impedance relays and deals specifically with:

- relays measuring phase angle (direction);
- relays measuring power.

The requirements in this standard relating to phase angle (direction) can be combined with requirements relating to other characteristics (e.g. current) specified in other parts of the IEC 255 series publications, so as to cover combinations such as “directional current relays”.

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For particular cases, supplementary requirements may be agreed between the manufacturer and the user or may be specified in national standards.

All tests in this standard are type tests.

This standard applies only to the relays in new condition.

2. Definitions

General terms are defined in IEC Publication 255-6 and in the International Electrotechnical Vocabulary (I.E.V.).

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

2.1 *Directional (phase angle measuring) relay*

A relay with two input energizing quantities and which, by its design, is intended to respond only to the relative phase position of a current or voltage with respect to another current or voltage reference.

2.2 *Power relay*

A relay with two input energizing quantities, current and voltage and which, by its design, is intended to respond only to power.

2.3 *Characteristic angle of power and directional relays**

The angle between the phasors representing the two energizing quantities, which is used for the declaration of the performance of the relay.

Note. — Particularly for electromechanical relays, it is usually the angle at which the maximum sensitivity occurs.

2.4 *Connection angle of power and directional relays**

The angle between the voltages which are identified with the phasors representing the two energizing quantities.

2.5 *Directional sensitivity*

The minimum value of one input energizing quantity at which the relay operates, the other input energizing quantity being at its reference value and the angle between the input energizing quantities being the characteristic angle.

SECTION TWO — REQUIREMENTS

3. Standard values

3.1 *Input and auxiliary energizing quantities and frequency*

The standard values of input and auxiliary energizing quantities and of frequency are as specified in IEC Publication 255-6.

3.1.1 *Effective range of input energizing quantities*

There are no standard effective ranges of input energizing quantities. These shall be declared by the manufacturer.

3.2 *Characteristic angle and connection angle*

3.2.1 *Value of characteristic angle and connection angle*

There are no standard values of the characteristic and connection angles. The characteristic angle, and the connection angle if any, shall be declared by the manufacturer. Other connection angles for various applications may also be declared by the manufacturer (see note with an asterisk, relating to Sub-clauses 2.3 and 2.4).

3.2.2 *Setting range of characteristic angle*

There are no standard setting ranges. The setting ranges of the characteristic angle, if any, shall be declared by the manufacturer.

3.3 *Specified times*

There are no standard rated values for specified times. The manufacturer shall declare whether the relay has independent or dependent specified times.

Note. — Dependent time characteristics are mainly applicable to power relays. For a directional relay, for which the characteristic quantity is angle, dependent times are applicable only in special cases.

* A given relay may have more than one characteristic angle. On the other hand, a given relay may be connected in alternative modes, e.g. by links, with a variety of connection angles. The combination of a given characteristic angle with a given connection angle results in an overall performance effective for a given application.

3.3.1 Independent specified time relays

Independent specified times shall be declared by the manufacturer.

3.3.2 Dependent time relays with increasing function

The shape of the characteristic curve shall be declared by the manufacturer (see Clause 5).

3.3.3 Dependent time relays with decreasing function

The shape of the characteristic curve shall be declared by the manufacturer (see Clause 5).

The most common characteristic curves for relays with decreasing function are given in Sub-clause 3.5.2 of IEC Publication 255-4: Single Input Energizing Quantity Measuring Relays with Dependent Specified Time.

Note.— Dependent time characteristics are mainly applicable to power relays. For a directional relay, for which the characteristic quantity is angle, dependent times are applicable only in special cases.

3.4 Resetting times

There are no standard values of resetting times. The values shall be declared by the manufacturer.

TABLE I

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

Influencing quantity of factor		Reference condition	Test tolerance	
Characteristic and input energizing quantities	Reference input energizing quantity	To be declared by the manufacturer or in national standards unless specified in clauses below or in lower level documents		
	Non-reference input energizing quantity			
	Phase angle between input energizing quantities (see Note 1)		Declared characteristic angle or range of angles	To be declared by the manufacturer or in national standards
	D.C. component in a.c.	Transient	Zero (see Note 2)	5% of peak a.c. value
	Setting value(s), where setting adjustments are possible		To be declared by the manufacturer or in national standards unless specified in clauses below or in lower level documents	
Auxiliary energizing quantities	D.C. component in a.c.	Transient	Zero (see Note 2)	5% of peak a.c. value

Notes 1.— A reference phase angle is necessary for directional relays when measuring time and sensitivity.

2.— In the special case of relays in which polyphase measurements are made on a single relay, the manufacturer or national standards shall define which of the input currents shall be under reference conditions.

TABLE II

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

Influencing quantity or factor		Nominal range
Characteristic and input energizing quantities	Reference input energizing quantity	As declared by manufacturer or in national standards
	Non-reference input energizing quantity	
	Phase angle between input energizing quantities	
	Frequency	
	Waveform	
	D.C. component in a.c.	
Auxiliary energizing quantities	Voltage or current	As declared by the manufacturer or in national standards unless specified in clauses below
	Frequency	
	Waveform	
	A.C. component in d.c. (ripple)	0 to 12% of the rated d.c. value*
	D.C. component in a.c.	Steady state transient

* This value of tolerance applies to peak-ripple factor (I.E.V. 131-03-14).

3.5 Standard reference values of influencing quantities and factors and standard values of their nominal and extreme ranges

3.5.1 Standard reference values of influencing quantities and factors

The standard reference conditions are given in Table I of IEC Publication 255-6. In addition, the standard conditions specified in Table I of this standard apply to directional relays and power relays.

3.5.2 Limits of the nominal ranges of the influencing quantities and factors

The standard values are specified in Table II of IEC Publication 255-6. In addition, the standard values specified in Table II of this standard apply to power and directional relays.

3.6 Characteristic quantities and setting range(s)

There are no standard rated values of either characteristic quantity(ies) or setting range(s). These values and the limits of setting range(s) shall be specified by the manufacturer.