

Harmonized system of quality assessment for electronic components

Generic specification: Solid state all-or-nothing relays of assessed quality. Generic data and methods of test

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Page	Issue
Front cover	2
Inside front cover	2
a	1
b	blank
i	2
ii	blank
EN title page (reverse blank)	1
1 to 55	original
Inside back cover	original
Back cover	2

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National foreword

This British Standard has been prepared by Technical Committee EPL/94 (formerly ECL1), and is the English language version of EN 117000 : 1991 *Generic specification: Solid state all-or-nothing relays of assessed quality. Generic data and methods of test*, published by the European Committee for Electrotechnical Standardization (CENELEC).

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled 'International Standards Correspondence Index', or using the 'Find' facility of the BSI Standards Electronic Catalogue.

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English version

**Generic Specification:
Solid state all-or-nothing relays of assessed quality.
Generic data and methods of test**

Spécification Générique:

Relais statiques de tout-ou-rien de qualité assurée.
Généralités et méthodes d'essai

Fachgrundspezifikation:

Gütebestätigte Halbleiterrelais.
Allgemeine Daten und Prüfverfahren

This European Standard was approved by the CENELEC Electronic Components Committee (CECC) on 14 October 1991. The text of this standard consists of the text of CECC 17000 Issue 2 : 1990 of the corresponding CECC Specification. CENELEC members are bound to comply with CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the General Secretariat of the CECC or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom. The membership of the CECC is identical with the exception of the national electrotechnical committees of Greece, Iceland and Luxembourg.

CECC

CENELEC Electronic Components Committee
Comité des Composants Electroniques du CENELEC
CENELEC Komitee für Bauelemente der Elektronik

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

CONTENTS

<u>Clause</u>		<u>Page</u>
	Foreword	3
	Preface	3
	SECTION 1 - SCOPE	4
	SECTION 2 - GENERAL	4
2.1	Order of precedence	4
2.2	Related documents	4
2.3	Units, symbols and terminology	6
2.4	Preferred values	6
2.5	Marking	6
	SECTION 3 - TERMS AND DEFINITIONS	
3.1	Construction	7
3.2	Type of relays	7
3.3	General terms	8
3.4	Prefixes for the values applicable to relays	10
3.5	Control signal values	10
3.6	Output values	11
3.7	Terms relating to times	12
	SECTION 4 - QUALITY ASSESSMENT PROCEDURES	
4.1	Primary stage of manufacture	13
4.2	Structurally similar components	13
4.3	Qualification approval procedures	13
4.4	Quality conformance inspection	13
4.5	Division into groups	13
4.6	Resubmission of rejected lots	14
4.7	Certified test records	14
4.8	Delivery of relays subjected to tests	14
4.9	Delayed delivery	14
4.10	Supplementary procedures for deliveries	14
4.11	Unchecked parameters	14
4.12	Release for delivery before the completion of Group B tests	15

SECTION 5 - TEST AND MEASUREMENT PROCEDURE

5.1	General	16
5.2	Alternative methods	16
5.3	Precision of measurement	16
5.4	Requirements in detail specifications	16
5.5	Standard conditions for testing	16
5.6	Visual inspection and check of dimensions	18
5.7	Mass	19
5.8	Terminal identification	19
5.9	'Must operate' and 'Must release' control signal current and voltage I_{ON} , V_{ON} , V_O	19
5.10	Peak on-state voltage V_{TM}	21
5.11	Zero turn-on voltage V_{TO}	22
5.12	Surge (Non-repetitive) on-state current I_{TSM}	23
5.13	Surge (Non-repetitive) on-state current I_{TSM} (with rapid rate of rise of reverse voltage)	25
5.14	Critical rate of rise of on-state current dI/dt	28
5.15	Critical rate of rise of commutating voltage dV/dt	30
5.16	Critical rate of rise of off-state voltage dV/dt	33
5.17	Off-state current I_D	36
5.18	Repetitive peak off-state voltage V_{DRM}	37
5.19	Non-repetitive peak off-state voltage V_{DSM}	39
5.20	Input circuit resistance	40
5.21	Dielectric test	41
5.22	Insulation resistance	41
5.23	Climatic sequence	41
5.24	Damp heat steady state	44
5.25	Rapid change of temperature	44
5.26	Accelerated thermal cycling	45
5.27	Enclosure	46
5.28	Corrosive atmosphere	47
5.29	Mould growth	47
5.30	Robustness of terminals	48
5.31	Soldering	48
5.32	Shock	49
5.33	Bump	50
5.34	Vibration	51
5.35	Acceleration	51
5.36	Electrical endurance	52
5.37	Thermal endurance	53
5.38	Voltage blocking	51
5.39	Resistance to solvents	54
5.40	Fire Hazard	55
5.41	Radio frequency interference (under consideration)	55

FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby accepted by all member countries without further testing.

This specification has been formally approved by the CECC, and has been prepared for those countries taking part in the System who wish to issue national harmonized specifications for **Solid state all-or-nothing relays of assessed quality. Generic data and methods of test.** It should be read in conjunction with the current regulations for the CECC System.

At the date of printing of this specification, the member countries of the CECC are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom, and copies of it can be obtained from the addresses shown on the blue fly sheet.

PREFACE

This specification was prepared by CECC WG 16: Relays. It is based, wherever possible, on the Publications of the International Electrotechnical Commission.

The text of this specification was circulated to the CECC for voting in the document indicated below and was ratified by the President of the CECC for printing as a CECC Specification.

<u>Document</u>	<u>Voting Date</u>	<u>Report on the voting</u>
CECC (Secretariat) 2326	January 1989	CECC (Secretariat) 2574

Note:

This Issue 2 of CECC 17 000 is the first specification related to solid state relays. Issue 1 of CECC 17 000 was titled 'Mercury wetted make contact units' and has been withdrawn in connection with the revision of the specifications for reed contact units. The latter will in future be covered by the generic specification CECC 19 000. These decisions were made during the meeting of CECC WG 16 on 3rd to 5th October 1990 in Great Malvern (GB).

Issue 2 is published initially in English and German only; the French text will follow as soon as it has been prepared.

SECTION 1 - SCOPE

This generic specification lists the test and measurement procedures which may be selected for use in detail specifications for solid state relays of assessed quality. It also specifies the quality assurance procedures to be followed.

Relays covered by this specification have d.c. control circuits and output ratings not exceeding 100 A.

Note: d.c. output devices are under consideration.

SECTION 2 - GENERAL

2.1 Order of Precedence

Where any discrepancies occur for any reason, the documents shall rank in the following order of authority :-

1. The detail specification
2. The sectional specification
3. The generic specification
4. The Internal Regulations of the FEN e.V. (Association for the Promotion of Electrotechnical Standardization)
5. Any other international documents (for example IEC) to which reference is made.

The same order of precedence shall apply to equivalent national documents.

2.2 Related Documents

ISO 1000 (1973)	SI units and recommendations for the use of their multiples and of certain other units.
ISO 8601 (1988)	Data Elements and Interchange Formats
IEC 27-1 (1976)	Letter symbols to be used in electrical technology. General.
IEC 50 -	International Electrotechnical Vocabulary
IEC 68 -	Basic environmental testing procedures. The following points are referenced :
IEC 68-1 (1982)	General and guidance
*IEC 68-2-1 (1983)	Test A, Cold
*IEC 68-2-2 (1976)	Test B, Dry Heat
IEC 68-2-3 (1969)	Test Ca, Damp heat, steady state
*IEC 68-2-6 (1983)	Test Fc, Vibration (sinusoidal)
IEC 68-2-7 (1983)	Test Ga, Acceleration, steady state
*IEC 68-2-10 (1972)	Test J, Mould growth
IEC 68-2-11 (1981)	Test Ka, Salt mist
IEC 68-2-13 (1983)	Test M, Low air pressure

IEC 68-2-14 (1984)	Test N, Change of temperature
IEC 68-2-17 (1978)	Test Q, Sealing
IEC 68-2-20 (1979)	Test T, Soldering
IEC 68-2-21 (1983)	Test U, Robustness of terminations and integral mounting devices.
*IEC 68-2-27 (1983)	Test Ea, Shock
*IEC 68-2-29 (1983)	Test Eb, Bump
IEC 68-2-30 (1980)	Test Db, Damp heat cyclic (12 + 12 hour cycle)
IEC 68-2-45 (1980)	Test XA, Immersion in cleaning solvents

*Including all amendments or supplements issued to the year indicated.

IEC 144 (1963)	Degrees of protection of enclosures for low-voltage switchgear and control gear.
IEC 147-5 (1977)	Essential ratings and characteristics of semiconductor devices, Part 5, Test methods.
IEC 748 (1984)	Letter symbols for semiconductor devices and integrated microcircuits.
IEC 255 -	Electrical relays. The following parts are referenced :
IEC 255-1-00 (1975)	All-or-nothing relays
IEC 255-5 (1977)	Insulation tests for electrical relays
IEC 410 (1973)	Sampling plans and procedures for inspection by attributes (see CECC 00 007)
IEC 443 (1974)	Stabilised supply apparatus for measurement
IEC 617 -	Graphical symbols for diagrams
IEC 695 -	Fire hazard testing The following parts are referenced :
IEC 695-2-1 (1980)	Glow wire test
IEC 695-2-2 (1980)	Needle-flame test
CECC 00 007 (1973)	Basic specification : Sampling plans and procedures for inspection by attributes.
./. (1986)	The Internal regulations of the FEN e.V.
CECC 00 107 (1977)	Rule of procedure 7: Quality assessment procedures (with amdt 1 to RP7)

CECC 00 109 (1974)	Rule of procedure 9: Certified test records
CECC 16 000 (1979)	Generic specification : Electromechanical All-or-Nothing relays
CECC 19 000 (1978)	Generic specification : Dry reed make contact units
CECC 50 000 (1980)	Generic specification : Discrete semiconductor devices.

2.3 Units, symbols and terminology

Units, graphical symbols, letter symbols and terminology shall, whenever possible, be taken from the following documents :-

ISO 1000 (1973)	SI units and recommendation for the use of their multiples and of certain other units.
IEC 27-1 (1976)	Letter symbols to be used in electrical technology, Part 1 : General
IEC 50 -	International Electrotechnical Vocabulary
IEC 748-1 (1984)	Letter symbols for semiconductor devices and integrated microcircuits.
IEC 617 (1983)	Graphical symbols for diagrams

2.4 Preferred Values

Preferred values shall be stated in the sectional specifications. They shall, as far as possible, adopt the relevant standard values of the IEC 255.

2.5 Marking

The sectional or detail specifications shall indicate the identification criteria and other information to be shown on the relay or packing. The letter or colour code shall be described in full or reference made to the appropriate specifications. The order of priority for marking small relays shall be specified.

The marking shall, as a minimum, consist of

- The trade mark or manufacturer's name
- Rated input and output values
- Terminal or circuit diagram
- Coded date of manufacture, in accordance with ISO 8601
- Relay type and variant code
- CECC Mark of Conformity

SECTION 3 - TERMS AND DEFINITIONS

The following paragraphs contain specific additional terminology applicable to solid state relays and shall be included in each national harmonized specification

3.1 Construction

3.1.1 Enclosure types

Relays having one of the following types of enclosure :-

- (1) Unenclosed
- (2) Enclosed or dust protected
- (3) Encapsulated
- (4) Hermetically sealed

3.1.2 Pattern

Relays of one enclosure type having a switching capacity of up to 100 A.

3.1.3 Style

Relays of one enclosure type and pattern having, for example one of the following terminations:

- (1) Solderable
- (2) Plug-in
- (3) Screw
- (4) Push-on

3.2 Types of Relays

3.2.1 Electrical relay (IEC 50-446)

A device designed to produce sudden, predetermined changes in one or more electrical output circuits after the appearance of certain conditions in the electrical input circuits controlling the device.

3.2.2 Solid State Relay (SSR) (Static relay)

A relay with isolated input and output whose functions are achieved by means of electronic, electromagnetic and/or electro-optic components and without the use of moving parts.

3.2.3 Zero-voltage turn-on relay (a.c. only)

A relay with isolated input and output in which added control circuitry delays the output turn-on until a zero voltage transition of the a.c. sine wave is detected.

3.2.4 Zero-current turn-off relay (a.c. only)

A relay with isolated input and output in which added control circuitry delays the output turn-off until a zero current transition of the a.c. sine wave is detected.

3.2.5. Instantaneous turn-on relay

A relay with isolated input and output which turns on when the control circuit is energised.

3.3 General terms

3.3.1 Rated isolation voltage (IEC 255-5)

The value of voltage which conventionally designates a relay circuit and to which dielectric tests, clearances and creepage distances are referred. (Normally measured between inputs and outputs, input and case output and case, and output and output when applicable).

3.3.2 Thyristor (IEV 521-04-38)

A bistable semiconductor device comprising three or more junctions which can be switched from the off-state to the on-state or vice versa.

3.3.3 Bidirectional triode thyristor (triac) (IEV 521-04-44)

A three-terminal thyristor having substantially the same switching behaviour in the first and third quadrants of the current voltage characteristics.

3.3.4 Derate

To reduce the rating of a relay due to change in operating conditions, such as reducing output current due to elevated ambient temperature.

3.3.5 Heat sink

A device which is used to dissipate the heat generated within a component by transferring heat to the surrounding ambient by means of conduction, convection and radiation. The heat sink is usually metallic and may be an auxiliary device or an integral part of the component.

3.3.6 Power loss

The loss that occurs within the relay primarily due to the on-state condition losses.

3.3.7 Surge current

A short duration increase of current to a magnitude substantially higher than its normal steady-state value.

3.3.8 Thermal resistance

The resistance of a material to the flow of heat, expressed in Kelvin per watt (K/W). The thermal resistance between two points in a relay is the ratio of the temperature difference between the two points to the power dissipation producing the heat flow.

3.3.9 Input

That portion of a relay to which a control signal is applied in order to achieve the switching function.

3.3.10 Output

That portion of the relay which performs the switching function required.

3.3.11 Commutating

The action of a thyristor in switching from the on-state to the off-state.

3.3.12 Off-State

The high impedance state of the relay output where only leakage current is flowing through the output circuit.

3.3.13 On-State

The low impedance state of the relay output.

3.4 Prefixes for the values applicable to relays

Values may be defined as rated, actual ("just"), test ("must") or characteristic value and identified as such by using one of these words as a prefix.

3.4.1 Rated value

Value of a quantity assigned generally by a manufacturer, for a specified operating condition of a relay.

3.4.2 Actual ("just") value

Value of a quantity determined by measurement on a single relay, when it just performs a specified function.

3.4.3 Test ("must") value

Value of a quantity with which, during tests, the relay is required to perform or not to perform a specified function.

3.4.4 Characteristic value

Value of a quantity with which, throughout its lifetime or a specified number of cycles, the relay is required to comply with a specified requirement

3.5 Control signal values

3.5.1 Control signal

An electrical quantity such as voltage, which when applied to the input of the relay under specified conditions enables it to fulfil its purpose.

3.5.2 Control voltage value

The voltage of the control signal.

3.5.3 Control current value

The current of the control signal.

3.5.4 Operative range of a control signal

The range of values of a control signal for which the relay under specified conditions is able to perform its intended function according to the specified requirements.