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Edition 4.0 2015-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Electromechanical elementary relays –
Part 1: General and safety requirements

Relais électromécaniques élémentaires –
Partie 1: Exigences générales et de sécurité

IEC 61810-1:2015-02(en-fr)

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ELECTROMECHANICAL ELEMENTARY RELAYS –

Part 1: General and safety requirements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 61810-1 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

This fourth edition cancels and replaces the third edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– two main test procedures were introduced: procedure A, reflecting the procedure known from Edition 3 of this standard and procedure B, reflecting the assessment according to North American requirements;
– inclusion of dedicated device application tests especially relevant for applications in the North American Market (see Clause D.1);
– introduction of testing under single mounting condition;
– clarification of insulation requirements after endurance testing;

– inclusion of provisions for basic safety requirements;

– update of references.

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

FDIS	Report on voting
94/380/FDIS	94/384RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 61810 series, published under the general title *Electromechanical elementary relays* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigenda of June 2017 and February 2018 have been included in this copy.

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ELECTROMECHANICAL ELEMENTARY RELAYS –

Part 1: General and safety requirements

1 Scope

This part of IEC 61810 applies to electromechanical elementary relays (non-specified time all-or-nothing relays) for incorporation into low voltage equipment (circuits up to 1 000 V alternate current or 1 500 V direct current). It defines the basic functional and safety requirements and safety-related aspects for applications in all areas of electrical engineering or electronics, such as:

- general industrial equipment,
- electrical facilities,
- electrical machines,
- electrical appliances for household and similar use,
- information technology and business equipment,
- building automation equipment,
- automation equipment,
- electrical installation equipment,
- medical equipment,
- control equipment,
- telecommunications,
- vehicles,
- transportation (e.g. railways).

Compliance with the requirements of this standard is verified by the type tests indicated.

In case the application of a relay determines additional requirements exceeding those specified in this standard, the relay should be assessed in line with this application in accordance with the relevant IEC standard(s) (e.g. IEC 60730-1, IEC 60335-1, IEC 60950-1).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038:2009, *IEC standard voltages*

IEC 60050 (all parts), *International Electrotechnical Vocabulary* (available at http://www.electropedia.org)

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-17:1994, *Basic environmental testing procedures – Part 2-17: Tests – Test Q: Sealing*

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60079-15:2010, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60099-1, *Surge arresters – Part 1: Non-linear resistor type gapped surge arresters for a.c. systems*[1]

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60364-4-44:2007, *Low voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60417, *Graphical symbols for use on equipment* (available at http://www.graphical-symbols.info/equipment)

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60664-4:2005, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60664-5:2007, *Insulation coordination for equipment within low-voltage systems – Part 5: Comprehensive method for determining clearances and creepage distances equal to or less than 2 mm*

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*[2]

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13:2010, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-10-2:2003, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

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1 Withdrawn.

2 This first edition has been replaced in 2014 by a second edition IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60721-3-3:1994, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*
IEC 60721-3-3:1994/AMD 1:1995
IEC 60721-3-3:1994/AMD 2:1996

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 61760-1:2006, *Surface mounting technology – Part 1: Standard method for the specification of surface mounting components (SMDs)*

IEC 61984:2008, *Connectors – Safety requirements and tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-444 and the following apply.

An alphabetical list of terms can be found at the end of this standard.

NOTE In the text of this standard, the term *relay* is used instead of *elementary relay* to improve the readability.

3.1 Terms and definitions related to general terms

3.1.1
marking
identification of a relay which, when completely given to the manufacturer of this relay, allows the unambiguous indication of its electrical, mechanical, dimensional and functional parameters

EXAMPLE Through the indication of the trade mark and the type designation on the relay, all relay-specific data can be derived from the type code.

3.1.2
intended use
use of a relay for the purpose for which it was made, and in the manner intended by the manufacturer

3.1.3
relay technology categories
categories of relays, based upon environmental protection

Note 1 to entry: Six categories are in use (RT 0 to RT V).

[SOURCE: IEC 60050-444:2002, 444-01-11]

3.1.4
pulse width modulation
PWM
pulse time modulation in which the pulse duration varies in accordance with a given function of the value of the modulating signal

[SOURCE: IEC 60050-702:1992, 702-06-57]

3.1.5
existing design
design which was already approved by the preceding Edition of this standard

3.1.6
hazard
potential source of harm

Note 1 to entry: Relevant hazards taken into account in this standard are heating, electrical shock, ignition and foreseeable misuse before the end of life.

3.1.7
type test
test of one or more devices made to a certain design to show that the design meets certain specifications

3.1.8
routine test
test to which each individual device is subjected during and/or after manufacture to ascertain whether it complies with certain criteria

3.1.9
sampling test
test on a number of devices taken at random from a batch

3.2 Terms and definitions of relay types

3.2.1
electrical relay
device designed to produce sudden and predetermined changes in one or more output circuits when certain conditions are fulfilled in the electric input circuits controlling the device

Note 1 to entry: For the purpose of this standard, output circuits are contact circuits.

Note 2 to entry: For the purpose of this standard, the term “coil” is used to denote “input circuit”, although other types of input circuits are possible.

[SOURCE: IEC 60050-444:2002, 444-01-01]

3.2.2
all-or-nothing relay
electrical relay, which is intended to be energized by a quantity, the value of which is either within its operative range or effectively zero

Note 1 to entry: "All-or-nothing relays" include both "elementary relays" and "time relays".

[SOURCE: IEC 60050-444:2002, 444-01-02]

3.2.3
elementary relay
all-or-nothing relay which operates and releases without any intentional time delay

[SOURCE: IEC 60050-444:2002, 444-01-03]

3.2.4
electromechanical relay
electrical relay in which the intended response results mainly from the movement of mechanical elements

[SOURCE: IEC 60050-444:2002, 444-01-04]

3.2.5
monostable relay
electrical relay which, having responded to an energizing quantity and having changed its condition, returns to its previous condition when that quantity is removed

[SOURCE: IEC 60050-444:2002, 444-01-07]

3.2.6
bistable relay
electrical relay which, having responded to an energizing quantity and having changed its condition, remains in that condition after the quantity has been removed; a further appropriate energization is required to make it change its condition

Note 1 to entry: Bistable relays are also called latching relays.

[SOURCE: IEC 60050-444:2002, 444-01-08]

3.3 Terms and definitions related to conditions and operations

3.3.1
release condition
for a monostable relay, specified condition of the relay when it is not energized; for a bistable relay, one of the specified conditions, as declared by the manufacturer

Note 1 to entry: See Figure A.1.

[SOURCE: IEC 60050-444:2002, 444-02-01]

3.3.2
operate condition
for a monostable relay, specified condition of the relay when it is energized by the specified energizing quantity and has responded to that quantity; for a bistable relay, the condition other than the release condition as declared by the manufacturer

Note 1 to entry: See Figure A.1.

[SOURCE: IEC 60050-444:2002, 444-02-02]

3.3.3
operate, verb
change from the release condition to the operate condition

Note 1 to entry: See Figure A.1.

[SOURCE: IEC 60050-444:2002, 444-02-04]