Irish Standard
I.S. EN 61810-2-1:2017

Electromechanical elementary relays - Part 2-1: Reliability - Procedure for the verification of B10 values

I.S. EN 61810-2-1:2017

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National Foreword

I.S. EN 61810-2-1:2017 is the adopted Irish version of the European Document EN 61810-2-1:2017, Electromechanical elementary relays - Part 2-1: Reliability - Procedure for the verification of B10 values

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61810-2-1

October 2017

ICS 29.120.70

Supersedes EN 61810-2-1:2011

English Version

Electromechanical elementary relays - Part 2-1: Reliability - Procedure for the verification of B_{10} values (IEC 61810-2-1:2017)

Relais électromécaniques élémentaires - Partie 2-1: Fiabilité - Procédure de vérification des valeurs de B_{10} (IEC 61810-2-1:2017)

Elektromechanische Elementarrelais - Teil 2-1: Funktionsfähigkeit (Zuverlässigkeit) - Verfahren zum Nachweis der B_{10}-Werte (IEC 61810-2-1:2017)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 94/416/FDIS, future edition 2 of IEC 61810-2-1, prepared by IEC/TC 94 "All-ornothing electrical relays" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61810-2-1:2017.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2018-04-06
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2020-10-06

This document supersedes EN 61810-2-1:2011.

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Endorsement notice

The text of the International Standard IEC 61810-2-1:2017 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

ISO 13849-2:2012	NOTE	Harmonized as EN ISO 13849-2:2012 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 61810-1	2015	Electromechanical elementary relays - Part 1: General and safety requirements	EN 61810-1	2015
IEC 61810-2	2017	Electromechanical elementary relays - Part 2: Reliability	EN 61810-2	2017
IEC 61810-3	-	Electromechanical elementary relays - Part 3: Relays with forcibly guided (mechanically linked) contacts	EN 61810-3	-
IEC 62061	-	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems	EN 62061	-
ISO 13849-1	2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1	2015

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IEC 61810-2-1

Edition 2.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electromechanical elementary relays – Part 2-1: Reliability – Procedure for the verification of B_{10} values

Relais électromécaniques élémentaires – Partie 2-1: Fiabilité – Procédure de vérification des valeurs de B_{10}

IEC 61810-2-1:2017-05(en-fr)

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IEC 61810-2-1

Edition 2.0 2017-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electromechanical elementary relays – Part 2-1: Reliability – Procedure for the verification of B_{10} values

Relais électromécaniques élémentaires – Partie 2-1: Fiabilité – Procédure de vérification des valeurs de B_{10}

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTROMECHANICAL ELEMENTARY RELAYS –

Part 2-1: Reliability – Procedure for the verification of B_{10} values

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 61810-2-1 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

This second edition cancels and replaces the first edition published in 2011. This edition constitutes a technical revision.

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

a) limitation of tests to 10 M cycles in Clause 5;
b) reduction of required number of test samples to 5 in specified cases;
c) introduction of WeiBayes analysis for routine test under Clause 4.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
94/416/FDIS	94/419/RVD

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

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

This International Standard is to be used in conjunction with IEC 61810-2:2017.

A list of all parts in the 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 document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

Based on the general provisions of IEC 61810-2, this part of IEC 61810 specifies reliability test procedures for electromechanical elementary relays where enhanced requirements for the verification of reliability apply. A type test is passed and then confirmed by routine tests with specified periodicity. This document describes how figures for B_{10} (the mean number of cycles until 10 % of the relays have failed) are derived from these life tests performed with representative relay samples.

In particular when electromechanical elementary relays are intended to be incorporated in safety-related control systems of machinery in accordance with IEC 62061 and ISO 13849-1, the mean time to dangerous failure ($MTTF_d$) is a measure that can be taken into account when assessing the probability of dangerous failure of the safety function concerned. Although a component failure cannot be defined as “dangerous” unless the detailed application is known, it is common to consider a failure mode that is likely to result in danger in a typical application of the component, and to refer to this failure mode as a “dangerous failure”. The $MTTF_d$ then becomes the expectation of the mean time to failure in this "dangerous" mode. For the calculation of $MTTF_d$ for electromechanical relays, the data provided by the manufacturer for B_{10D} can be used (see Clause C.4 of ISO 13849-1:2015).

Electromechanical elementary relays with forcibly guided (mechanically linked) contacts offer the possibility of a high diagnostic coverage according to 4.5.3 of ISO 13849-1:2015.

NOTE Requirements for such relays are given in IEC 61810-3.

ELECTROMECHANICAL ELEMENTARY RELAYS –

Part 2-1: Reliability – Procedure for the verification of B_{10} values

1 Scope

This part of IEC 61810 specifies reliability test procedures for electromechanical elementary relays when enhanced requirements for the verification of reliability apply.

Particular provisions are given for relays incorporated in safety-related control systems of machinery in accordance with IEC 62061 and ISO 13849-1. For such relays, B_{10} values for dangerous failures (B_{10D} values) are derived from the tests specified in this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61810-1:2015, *Electromechanical elementary relays – Part 1: General and safety requirements*

IEC 61810-2:2017, *Electromechanical elementary relays – Part 2: Reliability*

IEC 61810-3, *Electromechanical elementary relays – Part 3: Relays with forcibly guided (mechanically linked) contacts*

IEC 62061, *Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems*

ISO 13849-1:2015 *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61810-2 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
dangerous failure
failure which has the potential to put the safety-related part of a control system in a hazardous or fail-to-function state

[SOURCE: ISO 13849-1:2015, 3.1.5, modified – In the definition, the abbreviated term "SRP/CS" has been replaced by "safety-related part of a control system".]