

Electromechanical elementary relays -- Part 2: Reliability

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 61810-2:2011 sisaldab Euroopa standardi EN 61810-2:2011 ingliskeelset teksti.

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English version

**Electromechanical elementary relays -
Part 2: Reliability
(IEC 61810-2:2011)**

Relais électromécaniques élémentaires -
Partie 2: Fiabilité
(CEI 61810-2:2011)

Elektromechanische Elementarrelais -
Teil 2: Funktionsfähigkeit (Zuverlässigkeit)
(IEC 61810-2:2011)

This European Standard was approved by CENELEC on 2011-04-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CENELEC

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

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Foreword

The text of document 94/316/FDIS, future edition 2 of IEC 61810-2, prepared by IEC TC 94, All-or-nothing electrical relays, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61810-2 on 2011-04-01.

This European Standard supersedes EN 61810-2:2005.

The main changes with respect to EN 61810-2:2005 are listed below:

- inclusion of both numerical and graphical methods for Weibull evaluation;
- establishment of full coherence with the second edition of the basic reliability standard EN 61649;
- deletion of previous Annex A and Annex D since both annexes are contained in EN 61810-1.

This standard is to be used in conjunction with EN 61649:2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

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|--|-------|------------|
| — latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2012-01-01 |
| — latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2014-04-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61810-2:2011 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-191	1990	International Electrotechnical Vocabulary (IEV) - Chapter 191: Dependability and quality of service	-	-
IEC 60050-444	2002	International Electrotechnical Vocabulary - Part 444: Elementary relays	-	-
IEC 60300-3-5	2001	Dependability management - Part 3-5: Application guide - Reliability test conditions and statistical test principles	-	-
IEC 61649	2008	Weibull analysis	EN 61649	2008
IEC 61810-1	2008	Electromechanical elementary relays - Part 1: General requirements	EN 61810-1	2008

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	7
4 General considerations.....	9
5 Test conditions.....	10
5.1 Test items.....	10
5.2 Environmental conditions	10
5.3 Operating conditions	10
5.4 Test equipment	11
6 Failure criteria	11
7 Output data	11
8 Analysis of output data	11
9 Presentation of reliability measures.....	12
Annex A (normative) Data analysis.....	13
Annex B (informative) Example of numerical and graphical Weibull analysis.....	22
Annex C (informative) Example of cumulative hazard plot.....	26
Annex D (informative) Gamma function.....	32
Bibliography.....	33
Figure A.1 – An example of Weibull probability paper.....	16
Figure A.2 – An example of cumulative hazard plotting paper	18
Figure A.3 – Plotting of data points and drawing of a straight line	18
Figure A.4 – Estimation of distribution parameters	19
Figure B.1 – Weibull probability chart for the example.....	24
Figure C.1 – Estimation of distribution parameters.....	28
Figure C.2 – Cumulative hazard plots	30
Table B.1 – Ranked failure data.....	23
Table C.1 – Work sheet for cumulative hazard analysis	26
Table C.2 – Example work sheet.....	29
Table D.1 – Values of the gamma function.....	32

INTRODUCTION

Within the IEC 61810 series of basic standards covering elementary electromechanical relays, IEC 61810-2 is intended to give requirements and tests permitting the assessment of relay reliability. All information concerning endurance tests for type testing have been included in IEC 61810-1.

NOTE According to IEC 61810-1, a specified value for the electrical endurance under specific conditions (e.g. contact load) is verified by testing 3 relays. None is allowed to fail. Within this IEC 61810-2, a prediction of the reliability of a relay is performed using statistical evaluation of the measured cycles to failure of a larger number of relays (generally 10 or more relays).

Recently the technical committee responsible for dependability (TC 56) has developed a new edition of IEC 61649 dealing with Weibull distributed test data. This second edition contains both numerical and graphical methods for the evaluation of Weibull-distributed data.

On the basis of this basic reliability standard, IEC 61810-2 was developed. It comprises test conditions and an evaluation method to obtain relevant reliability measures for electromechanical elementary relays. The life of relays as non-repairable items is primarily determined by the number of operations. For this reason, the reliability is expressed in terms of mean cycles to failure (MCTF).

Commonly, equipment reliability is calculated from mean time to failure (MTTF) figures. With the knowledge of the frequency of operation (cycling rate) of the relay within an equipment, it is possible to calculate an effective MTTF value for the relay in that application.

Such calculated MTTF values for relays can be used to calculate respective reliability, probability of failure, and availability (e.g. MTBF (mean time between failures)) values for equipment into which these relays are incorporated.

Generally it is not appropriate to state that a specific MCTF value is “high” or “low”. The MCTF figures are used to make comparative evaluations between relays with different styles of design or construction, and as an indication of product reliability under specific conditions.

ELECTROMECHANICAL ELEMENTARY RELAYS –

Part 2: Reliability

1 Scope

This part of IEC 61810 covers test conditions and provisions for the evaluation of endurance tests using appropriate statistical methods to obtain reliability characteristics for relays. It should be used in conjunction with IEC 61649.

This International Standard applies to electromechanical elementary relays considered as non-repaired items (i.e. items which are not repaired after failure), whenever a random sample of items is subjected to a test of cycles to failure (CTF).

The lifetime of a relay is usually expressed in number of cycles. Therefore, whenever the terms “time” or “duration” are used in IEC 61649, this term should be understood to mean “cycles”. However, with a given frequency of operation, the number of cycles can be transformed into respective times (e.g. times to failure (TTF)).

The failure criteria and the resulting characteristics of elementary relays describing their reliability in normal use are specified in this standard. A relay failure occurs when the specified failure criteria are met.

As the failure rate for elementary relays cannot be considered as constant, particularly due to wear-out mechanisms, the times to failure of tested items typically show a Weibull distribution. This standard provides both numerical and graphical methods to calculate approximate values for the two-parameter Weibull distribution, as well as lower confidence limits.

2 Normative references

The following referenced documents are indispensable for the application 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 60050-191:1990, *International Electrotechnical Vocabulary (IEV) – Chapter 191: Dependability and quality of service*

IEC 60050-444:2002, *International Electrotechnical Vocabulary (IEV) – Part 444: Elementary relays*

IEC 60300-3-5:2001, *Dependability management – Part 3-5: Application guide – Reliability test conditions and statistical test principles*

IEC 61649:2008, *Weibull analysis*

IEC 61810-1:2008, *Electromechanical elementary relays – Part 1: General requirements*