

# PRE-RELEASE VERSION (FDIS)

---

## Electromechanical elementary relays – Part 4: General and safety requirements for reed relays

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 29.120.70

**Warning! Make sure that you obtained this publication from an authorized distributor.**



This is a preview - click here to buy the full publication

94/482/FDIS

FINAL DRAFT INTERNATIONAL STANDARD (FDIS)

PROJECT NUMBER:

**IEC 61810-4 ED1**

DATE OF CIRCULATION:

**2020-09-04**

CLOSING DATE FOR VOTING:

**2020-10-16**

SUPERSEDES DOCUMENTS:

**94/464/CDV, 94/475/RVC**

IEC TC 94 : ALL-OR-NOTHING ELECTRICAL RELAYS

SECRETARIAT:

Austria

SECRETARY:

Mr Bernhard Spalt

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 9,TC 31,TC 44,TC 45,TC 56,TC 59,TC 61,TC 62,TC 65,TC 79,TC 82

HORIZONTAL STANDARD:

FUNCTIONS CONCERNED:

EMC

ENVIRONMENT

QUALITY ASSURANCE

SAFETY

SUBMITTED FOR CENELEC PARALLEL VOTING

NOT SUBMITTED FOR CENELEC PARALLEL VOTING

**Attention IEC-CENELEC parallel voting**

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Final Draft International Standard (FDIS) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is a draft distributed for approval. It may not be referred to as an International Standard until published as such.

In addition to their evaluation as being acceptable for industrial, technological, commercial and user purposes, Final Draft International Standards may on occasion have to be considered in the light of their potential to become standards to which reference may be made in national regulations.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

**Electromechanical elementary relays – Part 4: General and safety requirements for reed relays**

PROPOSED STABILITY DATE: 2022

NOTE FROM TC/SC OFFICERS:

Copyright © 2020 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	6
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Influence quantities .....	10
5 Rated values .....	10
6 General provisions for testing .....	11
6.1 General .....	11
6.2 Type tests .....	11
6.3 Routine tests .....	12
6.4 Special tests .....	12
7 Documentation and marking .....	12
8 Heating .....	13
9 Basic operating function .....	13
10 Dielectric strength .....	14
11 Electrical endurance .....	15
12 Mechanical endurance .....	16
13 Clearances, creepage distances and solid insulation .....	16
13.1 General provisions .....	16
14 Terminations .....	16
15 Sealing .....	16
16 Heat and fire resistance .....	16
17 Short circuit capacity .....	16
18 Vibration .....	16
18.1 Procedure .....	16
18.2 Requirements .....	17
19 Shock .....	17
19.1 Procedure .....	17
19.2 Requirements .....	17
Annexes .....	18
Annex A (normative) Explanation regarding reed contacts of reed relays .....	19
Annex P (informative) High frequency characteristics test .....	20
P.1 General .....	20
P.2 Procedures .....	20
P.3 Requirements .....	21
Annex Q (informative) Special tests – Tests for environmental category .....	22
Q.1 General .....	22
Q.2 Classification of equipment .....	22
Q.3 Special tests for applications .....	22
Q.4 Railway applications – Rolling stock .....	22
Q.5 Tests and requirements .....	23
Bibliography .....	26

Figure 1 – Example of test arrangement.....	14
Figure A.1 – Example explaining terms relating to reed contacts of reed relay .....	19
Figure P.1 – Measurement circuit for scattering parameters measurement.....	21
Table 1 – Insulation resistance .....	10
Table 2 – Frequency range .....	11
Table 3 – Type testing .....	11
Table 4 – Routine tests .....	12
Table 5 – Special relays data.....	13
Table 6 – Dielectric voltage.....	15
Table 7 – Vibration test conditions .....	17
Table 8 – Shock test conditions .....	17
Table Q.1 – Special requirements for railway applications – rolling stock.....	23
Table Q.2 – Special tests for railway applications – rolling stock.....	23

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### ELECTROMECHANICAL ELEMENTARY RELAYS –

#### Part 4: General and safety requirements for reed relays

#### 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61810-4 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

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

FDIS	Report on voting
94/xxx/FDIS	94/xxx/RVD

Full information on the voting for the approval of this document 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.

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

This document is to be read in conjunction with IEC 61810-1.

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

Reed relays have been used in wide fields such as household and similar appliances, security control systems for appliances, measuring instruments, medical equipment, semiconductor and chip test equipment, information and communication equipment, power distribution facilities and transit vehicles, etc.

IEC 61810-4 provides technical deviations/additions to IEC 61810-1 in order to specify general and safety requirements for reed relays, as a result of component safety standards for relevant systems.

The reed switches are used as the switching contacts of the reed relays, all the requirements for reed contacts (reed switches) within the reed relay are read in conjunction with IEC 62246 (all parts).

## **ELECTROMECHANICAL ELEMENTARY RELAYS –**

### **Part 4: General and safety requirements for reed relays**

#### **1 Scope**

This part of IEC 61810 applies to electromechanical elementary relays with reed switches (reed contacts) incorporated into general control circuits. It defines the basic functional and safety requirements in all areas of electrical engineering or electronics in accordance with the parts of IEC 61810 series and IEC 62246 series.

This document defines technical deviations/additions to IEC 61810-1. It specifies type tests, routine tests, special tests and environmental tests to confirm the service conditions for applications.

NOTE The terms reed switch(es) and reed contact(s) are both in use for the description of the contact set in reed relays.

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

IEC 60077-1:2017, *Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules*

IEC 60077-2:2017, *Railway applications – Electric equipment for rolling stock – Part 2: Electrotechnical components – General rules*

IEC 60571:2012, *Railway applications – Electric equipment used on rolling stock*

IEC 61373:2010, *Railway applications – Rolling stock equipment – Shock and vibration tests*

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

IEC 61810-1:2015/AMD1:2019

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

IEC 61810-2-1:2017, *Electromechanical elementary relays – Part 2-1: Reliability – Procedure for the verification of  $B_{10}$  values*

IEC 61810-7:2006, *Electromechanical elementary relays – Part 7: Test and measurement procedures*

IEC 61810-10:2019, *Electromechanical elementary relays – Part 10: Additional functional aspects and safety requirements for high-capacity relays*

IEC 62246-1:2015, *Reed switches – Part 1: Generic specification*

IEC 62246-1-1:2018, *Reed switches – Part 1-1: Generic specification – Blank detail specification*

IEC 62497-1:2010, *Railway applications – Insulation coordination – Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment*  
IEC 62497-1:2010/AMD1:2013

IEC 62498-1:2010, *Railway applications – Environmental conditions for equipment – Part 1: Equipment on board rolling stock*