

INTERNATIONAL STANDARD

IEC
61811-10

QC 160100

First edition
2002-11

Electromechanical elementary relays of assessed quality –

Part 10: Sectional specification – Relays for industrial application

*Relais élémentaires électromécaniques
soumis au régime d'assurance de la qualité –*

*Partie 10:
Spécification intermédiaire –
Relais pour applications industrielles*



Reference number
IEC 61811-10:2002(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** (www.iec.ch)

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site (http://www.iec.ch/searchpub/cur_fut.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications (http://www.iec.ch/online_news/justpub/jp_entry.htm) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: custserv@iec.ch
Tel: +41 22 919 02 11
Fax: +41 22 919 03 00

INTERNATIONAL STANDARD

IEC 61811-10

QC 160100

First edition
2002-11

Electromechanical elementary relays of assessed quality –

Part 10: Sectional specification – Relays for industrial application

*Relais élémentaires électromécaniques
soumis au régime d'assurance de la qualité –*

*Partie 10:
Spécification intermédiaire –
Relais pour applications industrielles*

© IEC 2002 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

S

For price, see current catalogue

CONTENTS

FOREWORD	3
1 General	5
1.1 Scope	5
1.2 Normative references	5
1.3 Marking	6
1.4 Ordering information	6
2 Quality assessment procedures	6
2.1 Primary stage of manufacture	6
2.2 Structurally similar relays	6
2.3 Subcontracting	7
2.4 Qualification approval procedures	7
2.5 Quality conformance inspection requirements	7
2.6 Test schedule	7
2.7 Order of tests	8
3 Preparation of blank detail and detail specifications	8
3.1 Contents of blank detail and detail specifications	8
3.2 Basic test schedule	9
3.3 Test schedule for blank detail specifications	10
4 Relay reliability – Failure rate data	13
Annex A (informative) Explanations and examples regarding IL and AQL values	15
Annex B (informative) Data base for failure rates	17
Figure B.1 – Factor π_s depending on the operating cycles	20
Table 1 – Tests for quality conformance inspection	10-13
Table B.1 – Factor π_{ES}	20
Table B.2 – Factor π_T	21

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTROMECHANICAL ELEMENTARY RELAYS
OF ASSESSED QUALITY –**
**Part 10: Sectional specification –
Relays for industrial application**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61811-10 has been prepared by IEC technical committee 94: All-or-nothing electrical relays.

This standard cancels and replaces IEC 60255-19 (1983) and constitutes a technical revision.

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

FDIS	Report on voting
94/168/FDIS	94/172/RVD

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

The QC number that appears on the front cover of this publication is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ).

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

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

Withdrawn

iTech Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC 61811-10:2002](https://standards.iteh.ai/standards/iec/51afad8-a383-4cff-869c-aa57cde1afc0/iec-61811-10-2002)

<https://standards.iteh.ai/standards/iec/51afad8-a383-4cff-869c-aa57cde1afc0/iec-61811-10-2002>

ELECTROMECHANICAL ELEMENTARY RELAYS OF ASSESSED QUALITY –

Part 10: Sectional specification – Relays for industrial application

1 General

1.1 Scope

This part of IEC 61811 is a sectional specification applicable to electromechanical elementary (non-specified time all-or-nothing) relays of assessed quality for industrial application.

NOTE Electromechanical all-or-nothing telecom relays of assessed quality are covered by IEC 61811-50.

It is based on the basic relay standard IEC 61810-1 as well as on the generic specification IEC 61811-1 and selects from IEC 61810-7 the appropriate test and measurement procedures to be used in detail specifications derived from this specification. Moreover it contains a basic test schedule to be used in the preparation of such specifications. Detailed test schedules are given in the blank detail specifications supplementary to this sectional specification.

For the purpose of this standard, only fundamental tests have been compiled. Depending on the field of application, further tests should be selected as appropriate, preferably in accordance with the test and measurement procedures of IEC 61810-7.

1.2 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 60062:1992, *Marking codes for resistors and capacitors*

IEC 60255-23:1994, *Electrical relays – Part 23: Contact performance*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 61709:1996, *Electronic components – Reliability – Reference conditions for failure rates and stress models for conversion*

IEC 61810-1:1998, *Electromechanical non-specified time all-or-nothing relays – Part 1: General requirements*

IEC 61810-5:1998, *Electromechanical non-specified time all-or-nothing relays – Part 5: Insulation coordination*

IEC 61810-7:1997, *Electromechanical all-or-nothing relays – Part 7: Test and measurement procedures*

IEC 61811-1:1999, *Electromechanical non-specified time all-or-nothing relays of assessed quality – Part 1: Generic specification*

IEC QC 001002-3, *IEC Quality Assessment System for Electronic Components (IECQ) – Rules of Procedure – Part 3: Approval procedures*

1.3 Marking

Relays and their package supplied in accordance with detail specifications covered by this sectional specification, shall as a minimum be marked as follows:

1.3.1 Relay

- Trade mark or manufacturer's name
- Relay type and variant code
- Date of manufacture, year/week, coded in accordance with IEC 60062
- IECQ mark

Where space permits, a circuit diagram or terminal identification should be given.

1.3.2 Package

- Trade mark or manufacturer's name
- Detail specification reference if not marked on the relay
- Quantity
- Relay type and variant code
- Manufacturer's batch identification code

1.4 Ordering information

The ordering information shall be coded and shall contain the following details:

- IECQ detail specification number
- Coded coil voltage
- Terminal code
- Coded mounting arrangement
- Specials code

2 Quality assessment procedures

2.1 Primary stage of manufacture

The primary stage of manufacture is the first process subsequent to the manufacture of finished parts and subassemblies of the relay.

NOTE 1 A subassembly is understood to mean here the permanent assembly of two or more piece parts.

NOTE 2 Important manufacturing steps are as follows:

- a) fabrication, heat treatment and plating of the component parts of the relay;
- b) coil winding;
- c) assembling of the electrical and electromechanical parts;
- d) adjustment of the relay contacts, if applicable;
- e) high-temperature drying, gas backfilling and sealing of the relay, if applicable;
- f) final measurements and periodic inspection of test groups A to D.

2.2 Structurally similar relays

Relays are considered structurally similar if having no differences in design other than in:

- a) coil wire diameter, number of windings and the coil transient suppression device;
- b) types, numbers and material of contacts;
- c) rated coil and/or contact voltage(s);
- d) mounting and terminal variants within the limits prescribed in the detail specification.

2.3 Subcontracting

Subcontracting the primary stage of manufacture (see 2.1) and/or subsequent stages to an unapproved manufacturer is forbidden. Subcontracting is permitted for any stages preceding the primary stage of manufacture and shall be in accordance with the requirements of (normative) Annex B to Clause 2 of IEC QC 001002-3.

2.4 Qualification approval procedures

The manufacturer shall comply with the general requirements of the basic rules governing qualification approval defined in Clause 3 of IEC QC 001002-3 and the provisions given in 2.2 of IEC 61811-1.

The requirements contained in 4.2 of IEC 61810-1 shall be met.

Qualification approval tests shall include all the tests prescribed in the detail specification, and shall be performed by a schedule specifically prescribed in the detail specification.

Sampling shall be carried out in accordance with the sampling plans and procedures specified in IEC 60410. The number of specimens for each subgroup is specified in the blank detail specification. As a general rule, a minimum of five specimens are required for each group of tests. The qualification tests schedule may specify destructive and cumulative non-destructive tests.

2.5 Quality conformance inspection requirements

2.5.1 General requirements

Quality conformance inspection shall be carried out in accordance with the requirements of Clause 3 of IEC QC 001002-3 and 2.3 of IEC 61811-1.

2.5.2 Formation of inspection lots

Inspection lots to be submitted to group A and B acceptance tests shall be formed in accordance with 3.2.3 and 3.3.1 of IEC QC 001002-3 and with the sampling plans and procedures given in IEC 60410, except where production is too infrequent or too small for sampling plans to apply; in these cases inspection shall be 100 %.

When sampling is carried out in accordance with IEC 60410, the percent defective concept only shall be used. Stratified or representative sampling shall always be used to include all production lines and structurally similar relays in proportion to their respective quantities in the lot. Exceptions from proportionality may become necessary and shall be stated in the detail specification or agreed between the manufacturer and the National Supervising Inspectorate (NSI). Specimens shall be as representative as possible of the production.

2.5.3 Periodic inspection

Fixed samples for group C and D inspection shall be taken from a lot (or lots) which has passed group A and B inspection during, or at the end, of the specified reference period. In both cases the inspection lot (or lots) shall not be less than the average of production lots during the reference period for each group.

2.6 Test schedule

2.6.1 Test sequence

A test sequence shall consist of all tests listed in the (blank) detail specification.

The reference numbers of the tests are those of IEC 61810-7, with the exception of additional test(s) described in the sectional, the blank detail or the detail specification.

2.6.2 Groups A and B

The IL (inspection level) notation applies for all tests in one subgroup. A corresponding range of values for AQL (acceptable quality level) shall be given in the blank detail specification, and the authority preparing detail specifications shall choose the appropriate value which then applies to all tests in one subgroup.

2.6.3 Groups C and D

The blank detail specification shall prescribe for each subgroup:

- a) Periodicity of this subgroup. If the same periodicity is applicable to all subgroups, it shall be given at the beginning of the group test details.
- b) The minimum sample size for each test (or group of tests) performed with the same relays, the number of test specimens and the permitted number of defectives shall be specified.

2.7 Order of tests

Quality conformance inspection is divided into two parts: that carried out lot-by-lot, on which the release of the individual lots is based, and that carried out on a periodic basis which contains the time-consuming and more expensive tests.

Following 2.3 of IEC 61811-1, groups A and B contain lot-by-lot tests, while periodic tests required for the maintenance of qualification approval are contained in groups C and D.

When several tests are subsequently to be carried out on any one specimen or number of specimens, the following order shall apply unless otherwise prescribed in the blank detail specification:

- Screening or sorting tests (if applicable) and subgroup A1 shall always precede any other non-destructive (ND) or destructive (D) tests.
- The remaining tests shall be conducted as given in the blank detail specification. The order of tests within subgroups is mandatory.
- Destructive tests may be preceded by one or more non-destructive or destructive tests, provided that the effects of the preceding tests are not considered liable to invalidate the results of the later tests.

3 Preparation of blank detail and detail specifications

3.1 Contents of blank detail and detail specifications

Blank detail specifications shall conform with the test schedule given in Table 1 of this specification and the related explanations.

Tests marked M are mandatory. If tests are marked R (recommended) they may be included in the blank detail specification; they then become mandatory for the detail specification.

Blank detail specifications shall give the following information or call for inclusion into the detail specification:

- a) Identification of the detail specification.
- b) Identification of the relay and information on its applications. Identification shall be provided by such properties as rated power, dimensions, sealing, whether monostable or bistable, polarised or not, or otherwise required for identification.
- c) Outline drawings of the relay and key dimensions. Variants, such as for terminals, may be given in an annex to the detail specification.