

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electromechanical all-or-nothing relays –
Part 53: Blank detail specification – Electromechanical all-or-nothing telecom
relays of assessed quality – Two change-over contacts, 14 mm × 9 mm base**

**Relais électromécaniques de tout-ou-rien –
Partie 53: Spécification particulière cadre – Relais électromécaniques de tout-
ou-rien télécom sous assurance de la qualité – Deux contacts à deux directions,
surface d'encombrement de 14 mm × 9 mm**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMECHANICAL ALL-OR-NOTHING RELAYS –**Part 53: Blank detail specification –
Electromechanical all-or-nothing telecom relays of assessed quality –
Two change-over contacts, 14 mm × 9 mm base**

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.
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International Standard IEC 61811-53 has been prepared by IEC technical committee 94:
All-or-nothing electrical relays.

This bilingual version (2014-04) corresponds to the English version, published in 2002-03.

This second edition of IEC 61811-53 cancels and replaces the first edition published in 1997 and constitutes a technical revision.

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

FDIS	Report on voting
94/147/FDIS	94/161/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 3.

The committee has decided that the contents of this publication will remain unchanged until 2007. At this date, the publication will be

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- withdrawn;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

Withdrawn

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ELECTROMECHANICAL ALL-OR-NOTHING RELAYS –

Part 53: Blank detail specification – Electromechanical all-or-nothing telecom relays of assessed quality – Two change-over contacts, 14 mm × 9 mm base

1 General

1.1 Scope

This part of IEC 61811 is a blank detail specification applicable to electromechanical all-or-nothing telecom relays of assessed quality. Relays according to this standard are provided for operation in telecommunication applications. However, as electromechanical all-or-nothing relays, they are also suitable for particular industrial and other applications.

This standard selects from IEC 61810-7 and other sources the appropriate methods of test to be used in detail specifications derived from this specification, and contains basic test schedules to be used in the preparation of such specifications in accordance with IEC 61811-1.

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 60068-1:1988, *Environmental testing – Part 1: General and guidance*
Amendment 1 (1992)

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

IEC 60068-2-20:1979, *Environmental testing – Part 2: Tests: Test T – Soldering*
Amendment 2 (1987)

IEC 60068-2-47:1999, *Environmental testing – Part 2-47: Test methods – Mounting of components, equipment and other articles for vibration, impact and similar dynamic tests*

IEC 60255-14:1981, *Electrical relays – Part 14: Endurance test for electrical relay contacts – Preferred values for contact loads*

IEC 60695-2-2:1991, *Fire hazard testing – Part 2: Test methods – Section 2 – Needle-flame test*

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

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 61811-50:2002, *Electromechanical all-or-nothing relays – Part 50: Sectional specification – Electromechanical all-or-nothing telecom relays of assessed quality*

QC 001002-2:1998, *Rules of Procedure of the IEC Quality Assessment System for Electronic Components (IECQ) – Part 2: Documentation*

QC 001002-3:1998, *Rules of Procedure of the IEC Quality Assessment System for Electronic Components (IECQ) – Part 3: Approval procedures*

QC 001005:1996, *Register of Firms, Products and Services approved under the IECQ System, including ISO 9000*

CECC 00802:1990, *Guidance document: CECC Standard Method for the Specification of Surface Mounting Components (SMDs) of Assessed Quality*

(National authorized institutions will complete this clause by making reference to any documents or specifications directly referred to in their national equivalent of this standard.)

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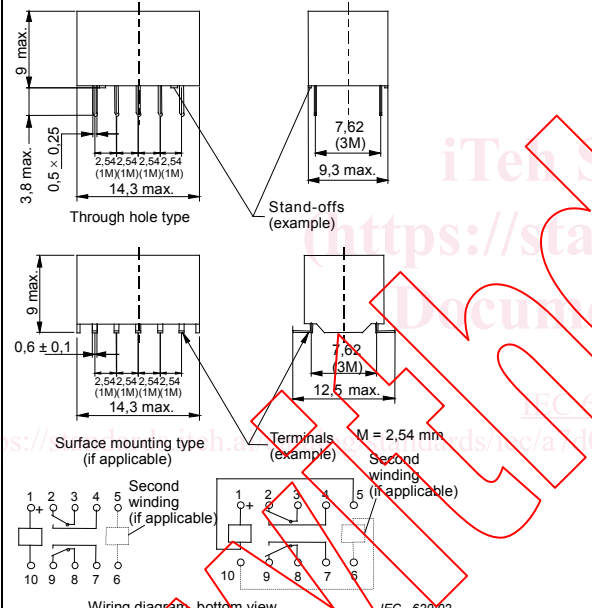
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1.3 Front page of the detail specification

The layout of the front page of the detail specification is as follows.

(1)	QC xxxxxx Edition: 200X Page 1 of X	(2)
Electronic components of assessed quality in accordance with: IEC 61810-7:1997 IEC 61811-50:2002	(3)	(4)
Detail specification for electromechanical all-or-nothing telecom relays of assessed quality, dual-in-line, with 14 mm × 9 mm base, two change-over contacts		
Type: two change-over contacts		
Construction: dual-in-line, with 14 mm × 9 mm base plastic sealed case, overall height of 9 mm max. relay properties RT III for conventional assembling techniques of printed circuit boards using mounting holes and soldering or for surface mounting technology (if applicable)		
Outline drawing or wiring diagram Dimensions in millimetres 	(7)	(8)
Application: Relays according to this standard are provided for the operation in telecommunication applications. However, as printed circuit board relays, they are suitable also for control or switching functions in particular industrial and other applications.		
Coil data Rated voltages:V d.c. Rated power:mW	(9)	(9)
Contact data Change-over break-before-make contacts Rated contact voltage: 110 V d.c. / 125 V a.c.* Rated contact current: 1,25 A max. Rated contact power: 30 W/50 VA* Limiting continuous current: 2 A max. * AC values mandatory only if stated in the detail specification.		
Component climatic category according to IEC 60068-1: 25/70/21 Temperature range – operating ambient temperature: –25 °C to 70 °C – storage temperature: –40 °C to 85 °C		
Information about manufacturers who have components qualified according to this detail specification is available in the current QC 001005.		

Key to front page

The numbers between brackets on the front page correspond to the following indications which should be given.

Identification of the detail specification

- (1) The name of the national standards organization under whose authority the detail specification is published and, if applicable, the organization from which the detail specification is available.
- (2) The IECQ symbol and the number allotted to the completed detail specification by the IECQ secretariat.
- (3) The number and the year of availability of the IEC standard concerning test and measurement procedures for electromechanical all-or-nothing relays and/or sectional specification; also national reference, if different.
- (4) If different from the IECQ number, the national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers.

Identification of the relay

- (5) Type: monostable or bistable, non-polarized or polarized, two change-over contacts.
- (6) Construction: sizes, for example dual-in-line, base and overall height, type of relay, based upon environmental protection (RT III), mounting variants and other typical construction details.
- (7) An outline drawing with main dimensions, which are of importance for interchangeability, and/or reference to the appropriate national or international document for outlines – see also note in box (7). Alternatively, this drawing may be given in an annex to the detail specification, but (7) should always contain an illustration of the general outer appearance of the component.

Location and dimensions of stand-offs (maximum relay height shall include stand-offs), position of terminal No. 1 relative to the outside shape, acceptable offset of the tip of a terminal relative to the nominal grid position, indication of the area on the top of the relay housing to enable automatic mounting using aspirators, suitable hole diameter for assembling on printed circuit board.

- (8) Typical field of applications.
- (9) Available rated coil voltages and rated power.
- (10) Available contact arrangements, defined special contact materials and contact voltage, current and power. The respective code digit for contact materials shall be listed in an annex, if applicable.
- (11) Component climatic category according to clause 8 and annex A of IEC 60068-1, and temperature range.

2 Characteristic values of the relay

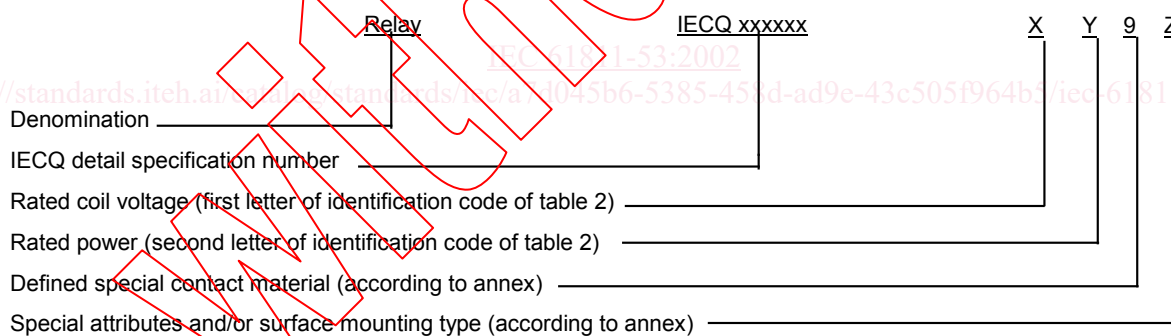
2.1 General data

- Thermal resistance: max. ... K/W
- Contact application: CA 0, CA 1, CA 2 and CA 3
- Relay mass: max. ... g
- Finish of the terminals: presoldering; admissible non-presoldered part: max. 1 mm to the stand-offs' plane, if applicable
- Insulation resistance: 1 000 M Ω min. at 500 V d.c. initial value
- Dielectric strength: see table 1

Table 1 – Dielectric test voltages

	Dielectric test V a.c. min.	Impulse voltage test 10/700 μ s and/or 1,2/50 μ s V min.
Opened contact circuits	500	
Between adjacent contact circuits	500	
Coil to contact circuits	500	
Between separated windings (if applicable)		

2.2 Construction of IECQ type designation (ordering information)



The coding of the monostable or bistable relay type shall be combined with the rated power of the coil, if applicable. The reference to two change-over contacts shall be given on the front page of the specification.

Use code 0 as the last digit if no special attributes apply. If one of the attributes in the example for a detail specification shall not be considered, the corresponding code number or letter shall be deleted; there shall be no special marks or open space for non-applicable attributes.

The manufacturer may use his own numbering system, provided that a conversion list with the IECQ type designations and the manufacturer's part numbers is given in an annex to the detail specification.

2.3 Coil data

Table 2 – Coil data

Identification code	Rated voltage V	Coil resistance at (23 ± 2) °C Ω ± 10 %	Must operate voltage V at coil temperature of			Maximum coil voltage V at	Must not release voltage V	Must release voltage V at coil temperature of			Rated power mW
			–25 °C	23 °C	70 °C			–25 °C	23 °C	70 °C	

2.4 Contact data

2.4.1 Electrical endurance and switching frequency

Contact failure: contact-circuit resistance of a closed contact higher than the value stated in 2.4.2, or resistance of an open contact circuit lower than 100 kΩ, both more than once per 10⁵ cycles or for the minimum number of switching cycles stated, calculated for each single contact.

Example: at a given endurance of 10⁶ operations, the total number of faults, as described above, shall not exceed 10.

Table 3 – Loads, contact-circuit resistance limits, switching cycles and frequencies for electrical endurance and overload tests

Loads	Contact-circuit resistance Ω max.	Number of switching cycles min.	Switching frequency cycles per s max.
Contact application 0	1	700 000	12,5
Resistive – max. contact voltage/max. power	1	100 000	3
Resistive – max. contact current/max. power	1	100 000	3
DC open-ended cable	1	1 000 000	12,5
Particular application-related, if required			
Overload	1 *	100	0,3

* Unless otherwise stated in the detail specification.

2.4.2 Static contact-circuit resistance

- 100 mΩ max. initial value at rated voltage;
- 10 mΩ max. difference of contact-circuit resistance at other coil voltages, (e.g. at must operate voltage for make contacts), initial value;
- 1 Ω max. during/after electrical endurance, mechanical endurance and environmental tests at rated voltage.

2.4.3 Mechanical endurance

10⁷ min. switching cycles.

2.4.4 Timing (without suppression device)

- Operate time: max. 5 ms
- Release time: max. 5 ms
- Bounce time when the contacts are closing: max. 5 ms
- Bounce time when the contacts are opening: max. 3 ms
- Transfer time on operation and release (last break contact opens before first make contact closes respectively last make contact opens before first break contact closes – each contact monitored): min. 0,1 ms

2.5 Mounting

The relay terminals are designed to be directly soldered onto the printed circuit board using conventional assembling techniques or for surface mounting technology (if applicable).

2.6 Environmental data

The relays shall withstand at least the following environmental stresses:

- shock, functional: 98,1 m/s² (10 g) half-sine acceleration, 11 ms duration;
- shock, survival: 294,3 m/s² (30 g) half-sine acceleration, 11 ms duration;
- vibration (sinusoidal): amplitude 0,75 mm or 98,1 m/s² (10 g), 10 Hz to 55 Hz;
- mechanical robustness of terminals
 - thrust: 1 N;
 - bending: 2 bends;
- soldering
 - if particular ageing is required, this shall be selected from procedure 1a, 1b, 2 or 3 of 4.2 of IEC 60068-2-20 and stated in the detail specification;
- Through-hole type:
 - solderability at 235 °C: 2 s;
 - resistance to soldering heat, terminal immersion time for 260 °C: 5 s or 10 s;
- surface mounting type:
 - class A1, CECC 00802, cl. 6.2 (i.e. 260 °C/5 s and 215 °C/40 s);
 - category 3, 6.2 of CECC 00802 (i.e. vapour phase soldering or infrared soldering, if the temperature stress is adequate);
- enclosure – leakage rate: max. 100 Pa cm³/s;
- resistance to cleaning solvents when rubbed with tissue paper
 - demineralized or distilled water at 55 °C: 5 min;
- fire hazard, needle flame: min. 10 s.

2.7 Package of relays for automatic handling (if applicable)

If stick magazines or tape and reel packaging for automatic handling (to facilitate automatic relay insertion) are used, their outline drawing (profile and length), storage capacity and possible marking shall be given in an annex.

3 Qualification approval procedures

- As stated in 3.1.4 a) of QC 001002-3, fixed sample.
- Sampling and test schedule are specified in table 5.
- The tests specified and their order are mandatory.
- Tests stated in table 6 are mandatory only if stated in the detail specification.

4 Quality conformance inspection

Quality conformance inspection contains the tests stated in table 4:

- groups A and B: lot-by-lot tests;
- group C: periodic tests.

Unless otherwise stated in this blank detail specification, all tests of table 4 are mandatory. Where a subgroup contains cumulative tests, the order of the tests is mandatory. Specimens subjected to tests denoted as destructive (D) shall not be released for delivery.

NOTE If a special level of AQL is required, the AQL value regarding subgroups A4, B1 and B2 in table 4 should be provided between the manufacturer and user of a relay.

4.1 Formation of inspection lots

According to 3.2.3 of QC 001002-3, the basis for determination of sample size for the quality conformance inspection is the relay quantity produced during one week.

4.2 Intervals between tests

- Subgroups A4, B1 and B2: minimum once a week.
- Subgroups C1 and C2: at least once a year.
- Subgroups C4 to C6: at least once every two years.

5 Marking and documentation

Relays and their package shall be marked as follows.

5.1 Marking of the relay

The marking shall be durable and easily legible, the following items shall be present:

- a) manufacturer's name, logo or trade mark;
- b) relay type and variant code;
- c) coded date of manufacture, in terms of year/week according to 1.5.3 of IEC 61811-50;
- d) IECQ in letters or IECQ mark of conformity;
- e) IECQ type designation (ordering information), if not implicit in b), see also 2.2;
- f) identification of terminal No. 1.

NOTE IECQ type designation in item e) may be omitted in an unavoidable case.