

INTERNATIONAL STANDARD

**Electrical relays - Tests and measurements -
Part 19: Electrical endurance**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Electrical relays - Tests and measurements - Part 19: Electrical endurance

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IEC 63522-19 has been prepared by IEC technical committee 94: Electrical relays. It is an International Standard.

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

Draft	Report on voting
94/1183/FDIS	94/1214/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63522 series, published under the general title *Electrical relays – Tests and measurements*, 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
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1 Scope

This part of IEC 63522 defines a test method to measure electrical endurance of electrical relays and provides the appropriate severities and conditions for measurements designed to assess the ability of all kinds of electrical relays to perform under expected conditions of transportation, storage and all aspects of operational use.

This document defines a test method for different kinds of electrical endurance.

NOTE Examples of electrical relays in the sense of this document include electromechanical relays, reed relays, reed contacts, reed switches, solid state relays, time relays and technology combinations of these.

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 60947-5-1:2024, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

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

IEC 63522-0:—, *Electrical relays - Tests and measurements - Part 0: Testing - General and guidance*¹

IEC 63522-4:2025, *Electrical relays - Tests and measurements - Part 4: Dielectric strength test*

IEC 63522-6:2025, *Electrical relays - Tests and measurements - Part 6: Contact-circuit resistance (or voltage drop)*

IEC 63522-7:2025, *Electrical relays - Tests and measurements - Part 7: Functional tests*

IEC 63522-41, *Electrical relays - Tests and measurements - Part 41: Tests and measurement procedures - Insulation coordination*

IEC 63522-45:2025, *Electrical relays - Tests and measurements - Part 45: Maximum frequency of operation*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in IEC 63522-0 and the following apply.

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

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

¹ Under preparation. Stage at the time of publication: IEC CDV 63522-0:2025.

3.1**making and breaking capacity**

greatest value of electric current which an output circuit is capable of making and breaking under specified conditions such as contact voltage, number of makes and breaks, power factor, time constant

Note 1 to entry: For alternating current, the RMS value is specified.

[SOURCE: IEC 60050-444:2002, 444-04-30 and IEC 60050-444:2002, 444-04-31, modification – The terms "limited making capacity" and "limited breaking capacity" have been merged to include both making and breaking.]

3.2**overload**

operating conditions in an electrically undamaged circuit, which cause an overcurrent

[SOURCE: IEC 60050-441:1984, 441-11-08]

3.3**utilization category**

combination of specified requirements related to the condition in which the switching device or the fuse fulfils its purpose, selected to represent a characteristic group of practical applications

Note 1 to entry: The specified requirements may concern e.g. the values of making capacities (if applicable), breaking capacities and other characteristics, the associated circuits and the relevant conditions of use and behaviour.

[SOURCE: IEC 60050-441:1984, 441-17-19, modified – The domain "(for a switching device or a fuse)" has been omitted.]

4 Test procedure**4.1 Purpose**

The purpose of this test procedure is to check the performance of the relay under operating conditions and for the number of cycles specified by the manufacturer.

NOTE With respect to the establishment and assessment of reliability data for relays, reference is made to IEC 61810-2.

4.2 Procedure**4.2.1 General**

The test is performed according to Table 2 on each contact load and each contact material as specified by the manufacturer.

The number of test samples shall be in compliance with the specified test procedure from Table 1.

Table 1 – Number of samples

Kind of testing	Test procedure	Number of samples	Mounting conditions
Type test	A	3	Group mounting
	B	1	Single mounting
Sampling test	n/a	3	n/a

Table 2 – Electrical endurance test procedures

Procedure	Test procedure ^{a, f}			
	A (Group mounting)	B (Single mounting)	B (Single mounting) and Annex B ^d	B (Single mounting) and Annex A ^e
Test sequence	Overload test (optional, see 4.2.2)	Overload test (optional, see 4.2.2)	Abnormal conditions Parameter given in Annex B	Overload test ^c Parameter given in Annex A
			Normal conditions Parameter given in Annex B	
	Electrical endurance		Electrical endurance Parameter given in Annex B	Electrical endurance Parameter given in Annex A
	Dielectric strength test			
	Heating test ^b (optional)		n/a	n/a

^a See also Table 1.

^b For application standards e.g. IEC 60730-1 or IEC 60669-1, the heating test is required after the electrical endurance test.

^c For electronic ballast: overload test is not required.

^d Following exactly the requirements in accordance with Annex B.

^e Following exactly the requirements in accordance with Annex A.

^f Following the circuit and load requirements given in IEC 63522-0.

Three severity levels are specified.

- Severity A: The first detected malfunction is defined as a failure.
- Severity B: The sixth detected malfunction or two consecutive malfunctions are defined as a failure.
- Severity C: As specified by the manufacturer.

The test circuit described in Annex A of IEC 63522-0:— shall be used, unless otherwise specified by the manufacturer and explicitly indicated in the test report.

The following applies only for high-capacity relays in accordance with IEC 61810-10:

- Severity level A is mandatory.
- If the relay has a defined polarity of a contact, the manufacturer shall specify an appropriate schematic for contact loading for the test, which may deviate from the schematics of Table 3.

The heating test following the electrical endurance test is mandatory if it is required by the relevant product application, for example in IEC 63522-10:2025, or by application standards (e.g. IEC 60730-1 or IEC 60669-1).

4.2.2 Overload

4.2.2.1 General

The purpose of this test is to assess the performance of a DUT when subjected to overload (fault) conditions.

An overload test shall be performed if the manufacturer specifies value(s) for the limiting making and/or breaking capacity higher than the rated switching current (see Table 2).