

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Electrical relays – Tests and measurements –  
Part 15: Robustness of terminals**

**Relais électriques – Essais et mesurages –  
Partie 15: Robustesse des bornes**

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## CONTENTS

FOREWORD .....	3
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions .....	6
4 Test procedure .....	6
4.1 Purpose .....	6
4.2 Procedure .....	6
4.3 Conditions .....	7
5 Evaluation .....	7
5.1 General.....	7
5.2 Test report .....	7
Bibliography.....	8

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**ELECTRICAL RELAYS –  
TESTS AND MEASUREMENTS –**
**Part 15: Robustness of terminals****FOREWORD**

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IEC 63522-15 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
94/1052/FDIS	94/1081/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts of 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](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

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# ELECTRICAL RELAYS – TESTS AND MEASUREMENTS –

## Part 15: Robustness of terminals

### 1 Scope

This document is used for testing electromechanical elementary relays (electromechanical relays, reed relays, reed contacts, reed switches and technology combinations of these) and for evaluating their ability to perform under expected conditions of transportation, storage and all aspects of operational use.

This document defines a standard test method that applies defined loads to relay terminals (direct axial pulls, bending or twisting) as they can be present in assembled configurations or during handling. In addition, it covers torque stress for nuts and threaded terminals as they are likely to be experienced during normal assembly operations.

### 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 60068-2-21, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

IEC 61210:2010, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 63522-0:— *Electrical relays – Tests and measurements – Part 0: Testing – General and guidance*<sup>1</sup>

IEC 63522-1, *Electrical relays – Tests and measurements – Part 1: Visual inspection and check of dimensions*<sup>2</sup>

IEC 63522-3, *Electrical relays – Tests and measurements – Part 3: Relay coil properties*<sup>3</sup>

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

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<sup>1</sup> First edition under preparation. Stage at the time of publication: IEC CDV 63522-0:2024.

<sup>2</sup> First edition under preparation. Stage at the time of publication: IEC CDV 63522-1:2023.

<sup>3</sup> First edition under preparation. Stage at the time of publication: IEC CDV 63522-3:2024.

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63522-0 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>

### 4 Test procedure

#### 4.1 Purpose

The purpose of this test is to determine the ability of relay terminals to withstand direct axial pulls, bending or twisting.

For nuts and threaded terminals the defined test allows an evaluation with regard to their ability to withstand torques likely to be experienced during normal assembly operations.

#### 4.2 Procedure

The tests stated in this document shall be carried out with appropriate test conditions and severities, as well as suitable measurements conditions.

Screw terminals and screwless terminals shall be tested as specified in IEC 60999-1:1999, Clause 5 and Clause 9.

Flat quick-connect terminations shall be tested as specified in IEC 61210:2010, Clause 7, and IEC 61210:2010, 8.1 and 8.2.

All other terminations or integral mounting elements of DUTs shall be subjected to test  $U_{a1}$ ,  $U_{a2}$ ,  $U_b$ ,  $U_c$ ,  $U_d$  or  $U_e$  (for SMD terminals) of IEC 60068-2-21, as appropriate.

A minimum of three relay samples shall be tested.

On every device under test (DUT) at least three terminations of the same size and type shall be tested.

If the tests are carried out on a complete DUT, testing on one termination shall not influence or compromise the test results of the other terminations.

If the required number of tests is not achievable on an individual DUT (e.g., insufficient number of terminals per DUT or the testing has an impact on other terminals), additional DUTs shall be used.



### 4.3 Conditions

The DUT shall be in a new and clean condition, mounted as in service or as specified by the manufacturer. The test shall be performed under applicable reference conditions given in IEC 63522-0:—<sup>4</sup>, 4.4.

The conditions to be specified are the following:

- a) applicable tests and corresponding loads
  - for screw terminals and screwless terminals from IEC 60999-1;
  - for flat quick-connect terminations from IEC 61210;
  - for all other terminations or integral mounting elements of DUTs from IEC 60068-2-21;
- b) number of terminals to be tested, if larger than three, according to IEC 63522-0.

## 5 Evaluation

### 5.1 General

Final evaluation shall be done and documented as follows:

- Evaluation according to the requirements of the chosen test from IEC 60068-2-21, or IEC 60999-1, or IEC 61210,
- Visual inspection and check of dimensions as specified in IEC 63522-1,
- Coil resistance is measured in accordance with IEC 63522-3,
- Contact-circuit resistance is measured in accordance with IEC 63522-6,
- Other final measurements, if required.

The DUTs should not show any sign of damage or malfunction. All parameters should be within the defined product specification.

### 5.2 Test report

If this document is executed as a part of a test record of another standard, then the results shall be reported as required in the other standard.

Otherwise, it is recommended to issue a dedicated test report according to this document.

The test report shall contain all the information necessary to reproduce the test. In particular, the following shall be recorded.

The test report shall include at least the following:

- Number of DUTs under test, numbered individually;
- Initial condition of each of the DUTs;
- Test procedure applied according to 4.2;
- Test conditions used according to 4.3;
- Evaluation of each DUT individually, as defined under 5.1;
- Test method/setup (only if several setups possible);
- If applicable, any other observations.

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<sup>4</sup> First edition under preparation. Stage at the time of publication: IEC CDV 63522-0:2024.

## Bibliography

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

IEC 61810-1:2015/AMD1:2019

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