SLOVENSKI STANDARD
oSIST prEN IEC 61810-7-39:2023

01-oktober-2023

Električni releji - Preskusi in meritve - 7-39. del: Sile za vtikanje in izvlačenje

Electrical relays - Tests and Measurements - Part 7-39: Insertion and withdrawal force

Relais électriques - Essais et mesurages - Partie 7-39: Force d'insertion et de retrait

Ta slovenski standard je istoveten z: **prEN IEC 61810-7-39:2023**

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94/920/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 61810-7-39 ED1	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-08-18	**2023-11-10**
SUPERSEDES DOCUMENTS:	
94/787/CD, 94/906/CC	

IEC TC 94 : ELECTRICAL RELAYS	
SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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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.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Electrical relays – Tests and Measurements – Part 7-39: Insertion and withdrawal force

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL RELAYS – Tests and Measurements

Part 7-39: Insertion and withdrawal force

FOREWORD

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The International Standards of the IEC 61810 have been prepared by IEC technical committee 94: All-or-nothing electrical relays.

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

CD	CC
94/787/CD	94/906/CC

Full information on the voting for the approval of this International Standard 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 International Standard is to be used in conjunction with IEC 61810-1:2015 and 61812-1:xxxx

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.

ELECTRICAL RELAYS – Tests and Measurements

Part 7-39: Insertion and withdrawal force

1 Scope

This part of IEC 61810, when required by the detail specification, is used for testing electromechanical elementary relays, time relays and similar components within the scope of IEC technical committee 94. This test may also be used for similar devices when specified in a detail specification.

The object of this test is to define standard test methods for:

1. measuring the insertion and withdrawal forces of the mating relay and socket
2. measuring the insertion and withdrawal forceson relays with flat quickconnect terminations
3. verifying the correct connection of flat terminals with eye lug connectors.

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

IEC 61810-7-0:xxxx, *Electromechanical elementary relays - Part 7: Test and measurement procedures - Part 0 Testing general*

IEC 61810-7-1:xxxx, *Electromechanical elementary relays - Part 7: Test and measurement procedures - Part 1 Visual inspection and check of dimensions*

IEC 61984:2008 , *Connectors - Safety requirements and tests*

IEC 60512-13-2:2006, *Connectors for electronic equipment - Tests and measurements - Part 13-2: Mechanical operation tests - Test 13b: Insertion and withdrawal forces*

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

3 Terms and definitions

Clause 3 of IEC 61810-7-0 is applicable.

4 Test procedure

4.1 Insertion and withdrawal force on mating relay and socket

4.1.1 Purpose

These tests are applicable to all elementary relays used in conjunction with sockets. The specimen shall consist of a mating pair of relay and socket with all terminations in place

Purpose of this document is to measure the insertion and withdrawal forces of the mating relay and socket.

4.1.2 Procedure

The insertion and withdrawal forces of the mating relay and socket shall be tested in the following way, derived from IEC 60512-13-2:

- Visual examination shall be done. There shall be no defects that would impair the validity of the test.
- The sockets shall be rigidly fixed in normal working position (e.g. on IEC 60715 mounting rail) The relays shall be fully inserted into the sockets and withdrawn from them, without the effect of any locking, latching, sealing, engaging, separating, or similar device, in a normal manner unless special instructions are given in the detail specification.
- The forces to fully insert and withdraw the relay into the socket shall be measured. This shall be done as many times as required by the detail specification. At least, the forces for the first and last cycle shall be recorded.
- In order to determine the correct mating, an appropriate signalling method (like a led) will be used.

4.1.3 Conditions

The conditions to be specified are the following:

a) maximum value of the insertion force;

b) maximum and minimum values of the withdrawal force;

c) difference from the forces for initial and final cycle, if different from 50 %

d) number of insertion and withdrawal cycles;

e) speed rate of insertion and withdrawal, if necessary;

f) description of test groups, if applicable;

g) description of test unit, if applicable;

h) description of the lubricant and modality of its application, if applicable

i) mounting position of sockets

4.2 Insertion and withdrawal force on relays with flat quickconnect terminations

4.2.1 Purpose

These tests are applicable to all elementary relays with flat quickconnect terminations compliant with IEC 61210:2010.

Purpose of this document is to measure the insertion and withdrawal forces of standard female connectors into relay male terminations.

4.2.2 Procedure

Unless otherwise specified, minimum 3 relays, for a total of minimum 12 terminals, will be used. Each relay male terminal will be tested with a new female connector.

For each combination, the female connector will be slowly and steadily inserted and withdrawn in the relay terminal six times at a rate of travel of approximately 1 mm/s.

Insertion and withdrawal force measurements shall be made with any suitable testing device providing accurate alignment and being capable of holding the reading. An example of a suitable device is shown in Annex B of IEC 61210

4.2.3 Conditions

The conditions to be specified are the following:

a) tab size;

b) any deviation from IEC 61210 prescriptions on dimensions of flat terminations;

c) maximum value of the insertion force, if different from Table 1;

d) minimum values of the withdrawal force, if different from Table 1;

e) number of insertion and withdrawal cycles, if different from 6;

f) speed rate of insertion and withdrawal, if necessary;

g) mounting position of relays and way of fixing (e.g. mounting flanges, IEC 60715 mounting rail connector)

4.3 Connection of relays with flat terminations for eye lug connectors

4.3.1 Purpose

These tests are applicable to all elementary relays with flat terminations with an hole, suitable for connections with eye lug connectors through nut and screw

Purpose of this document is to verify that the connection with a wire terminated with an eye lug connector do not cause any modification on the relays (specially to the contact adjustment) due to the relevant tightening torque used for fixing the screw

4.3.2 Procedure

Unless otherwise specified, minimum 3 relays, for a total of minimum 12 terminals, will be used.

With a suitable method, possibly 4 wire, the resistance of the connection shall be measured before, during and after the tightening of the screw.

4.3.3 Conditions

The conditions to be specified are the following:

a) screw diameter and thread

b) tightening torque

c) mounting position of relays and way of fixing (e.g. mounting flanges, IEC 60715 mounting rail connector)

5 Evaluation

5.1 Insertion and withdrawal force on mating relay and socket

Visual examination shall be performed according to IEC 61810-7-1, with 10 × magnifications, at least at the beginning and at the end of the test. Any defects, which would impair the normal functioning of relay and socket connectors, shall be documented.

Note It is recommended, for better evaluation, to perform additional analysis, like X-ray or cutting image.

The difference between the forces for the initial (I) and final (F) cycle shall be recorded. The force for the final cycle F shall be in the interval F = I ± 50 %, unless differently specified (see above condition c)

5.2 Insertion and withdrawal force on relays with flat quickconnect terminations

Unless differently prescribed, the insertion and withdrawal forces shall be within the limits as specified in Table 1

Table 1 – Insertion and withdrawal forces

Size mm	Insertion force N	Sixth withdrawal force N
	Maximum	Minimum
2,8 mm	53	5
4,8 mm	67	9
6,3 mm	80	18
9,5 mm	100	20

5.3 Connection of relays with flat terminations for eye lug

The resistance of the connection shall not vary more than 10 % (unless differently prescribed), during all the procedure.