SLOVENSKI STANDARD
oSIST prEN IEC 61810-7-19:2023

01-oktober-2023

Električni releji - Preskusi in meritve - 7-19. del: Električna življenjska doba

Electrical relays - Tests and Measurements - Part 7-19: Electrical endurance

Ta slovenski standard je istoveten z: **prEN IEC 61810-7-19:2023**

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94/926/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61810-7-19 ED1**	
DATE OF CIRCULATION: **2023-08-18**	CLOSING DATE FOR VOTING: **2023-11-10**
SUPERSEDES DOCUMENTS: **94/851/CD, 94/913/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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TITLE:

Electrical relays – Tests and Measurements - Part 7-19: Electrical endurance

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 7-19: Electrical endurance

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
94/851/CD	94/913/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.

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- withdrawn,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 7-19: Electrical endurance

1 Scope

This part of IEC 61810-7 is used for testing along with the appropriate severities and conditions for measurements and tests designed to assess the ability of specimens to perform under expected conditions of transportation, storage and all aspects of operational use.

The object of this part gives guidance to perform different kind of electrical endurance.

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 60669-1:2017, *Switches for household and similar fixed-electrical installations - Part 1: General requirements*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

IEC 61810-7-0:202X, *Electrical relays – Tests and Measurements - Part 7-0: Testing – General and Guidance*

IEC 61810-7-4:202X, *Electrical relays – Tests and Measurements - Part 7-4: Dielectric strength test*

IEC 61810-7-6:202X, *Electrical relays – Tests and Measurements - Part 7-6: Contact-circuit resistance (or voltage drop)*

IEC 61810-7-7:202X, *Electrical relays – Tests and Measurements - Part 7-7: Functional Tests*

IEC 61810-7-45:202X, *Electrical relays – Tests and Measurements - Part 7-45: Maximum frequency of operation*

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

IEC 62246-1:2015, *Reed Switches – Part 1: Generic Specification*

3 Terms and definitions

For the purpose of this document, the terms and definitions given in clause 3 of IEC 61810-7-0 and the following apply

3.1 Terms and definitions related to general terms

3.1.1

making and breaking capacities
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 For alternating current, the RMS value is specified.

[SOURCE: IEC 60050-444:2002, 444-04-30 and 444-04-31, merged – modification of the term and definition]

3.1.2

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

[SOURCE: IEC 60050-441:1984/AMD1:2000, 441-11-08]

3.1.3

utilization category
a 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 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/AMD1:2000, 441-17-19]

4 Test procedure

4.1 Purpose

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]			
	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 4.4)	Overload test (optional, see 4.4)	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 after the electrical endurance is requested.

[c] For electronic ballast: overload test is not requested.

[d] Following exactly the requirements in accordance with Annex B.

[e] Following exactly the requirements in accordance with Annex A.

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 61810-7-0 shall be used, unless otherwise specified by the manufacturer and explicitly indicated in the test report.

For high-capacity relays according IEC 61810-10 and reed switches according IEC 62246-1 applies only the following:

- 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 after the electrical endurance is mandatory if prescribed by the relevant product application for example Clause 8 and Annex E in IEC 61810-1, or by application standards (e.g. IEC 60730-1 or IEC 60669-1).

4.2.2 Electrical endurance

Unless otherwise explicitly stated by the manufacturer, this test is carried out at the upper limit of the ambient temperature range, and the relay coil(s) shall be energized with rated voltage or an appropriate value within the rated coil voltage range or operative range.

The contacts shall be monitored to detect break and/or make malfunctions as well as unintended bridging.

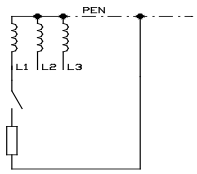
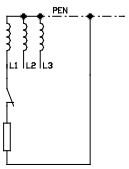
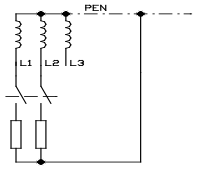
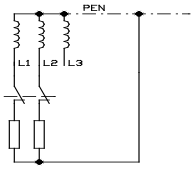
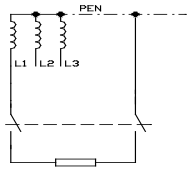
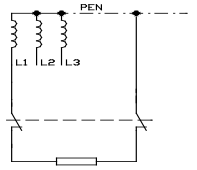
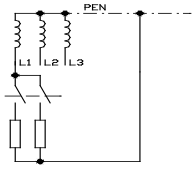
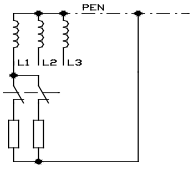
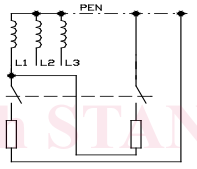
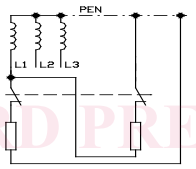
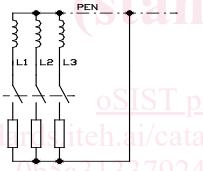
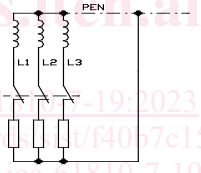
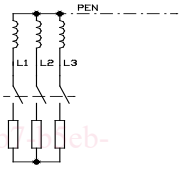
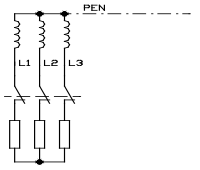
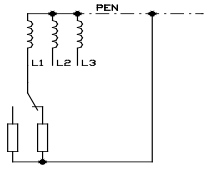
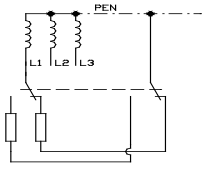
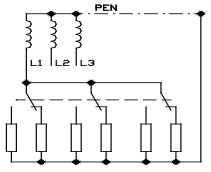
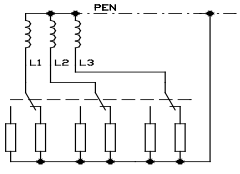
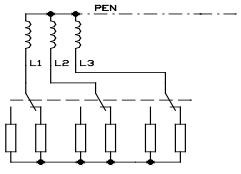
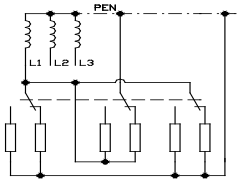
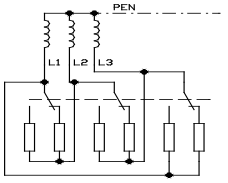
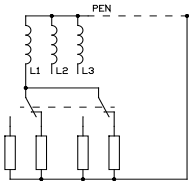
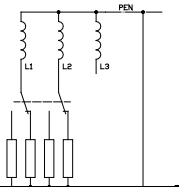
The preferred arrangement of the relays is group mounted under the mounting conditions of Annex A of IEC 61810-7-10 for the heating test unless otherwise prescribed by the manufacturer. For PCB relays it is permitted to use a PCB for connecting the relays with the wires and ensure the minimum mounting distances. However, the dimensions of the connecting wires shall be according to clause 4.9 of IEC 61810-7-0.

The contacts are connected to the load(s) in accordance with Table 3 as specified and indicated by the manufacturer. If not otherwise specified by the manufacturer, the load shall be applied to both the make and break side of a change-over contact.

If not otherwise specified, the frequency of operations shall be 360 operations per hour with duty type S6 50% in accordance to IEC 61810-7-0 and for 6000 operations. However, the frequency of operations shall be less than the maximum frequency of operation according to IEC 61810-7-45.

Relays provided with an additional actuating member for manual operation (for example push-button) shall be tested respectively to verify that the relay is capable to switch on and off properly its maximum rated switching current at related voltage for the number of manual operations within a time diagram stated by the manufacturer at ambient temperature in accordance with Table 2 of IEC 61810-7-0 at least 100 times - if not otherwise specified by the manufacturer.

217 **Table 3 – Schematics for contact loading**

Single-pole contact	a 	b 	
Double-pole contact	c 	d 	e 
	f 	g 	h 
	i 	j 	
Multi-pole contact	k 	l 	m 
	n 		
Change-over contact	o 	p 	q 
	r 	s 	t 
	u 	v 	w 
If none of the schematics applies, the manufacturer shall indicate an appropriate one.			

218

219 **4.3 Conditions to be specified**

220 The conditions to be specified are the following:

221 a) type of relay and contact material;

222 b) total number of cycles or test duration for each contact and number of contacts to be tested
223 simultaneously;

224 c) severity level;

225 d) ambient conditions (particularly ambient temperature);

226 e) method of mounting;

227 f) energization value and, if required, frequency;

228 g) switching current, if other than rated current;

229 h) power factor (cos φ), time constant (L/R) and test circuit details as appropriate;

230 i) frequency of operation (in number of cycles per hour) and duty factor;

231 j) total number of cycles, if other than 6000 cycles;

232 k) protective and transient suppression devices, if required;

233 l) details of test circuit or checking equipment, adapters, etc., if required;

234 m) fuse rating, if required;

235 n) final measurements:

236 • dielectric test as specified in in IEC 61810-7-4 - for function isolation with 75 % of the
237 specified initial value for new condition;

238 • any other measurements as specified by the manufacturer.

239

240 **4.3.1 Overload**

241 To assess the performance of a relay when subjected to overload (fault) conditions.

242 During the test, the relay mounting face and any exposed metallic parts shall be connected to
243 the power supply negative and/or neutral point or earthed via a fuse rated at 5 % of the
244 maximum switching current, or 100 mA, whichever is the greater, unless otherwise specified.

245 NOTE 1 The relay mounting face (surface, cover, aso) is usually produced out of plastics. In such cases the surface
246 could be coated for instance with a conductive foil or prepared cover to ensure a proper connection.

247 NOTE 2 The layer should as thin as possible to ensure less influence back to the test – like cooling the surface...

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

250 The number of cycles shall be 50 ± 2 for DC contact loads, and 50 ± 2 for AC contact loads,
251 unless otherwise specified.

252 The overload test on a CO contact could be done sequentially – NO and NC contact side
253 separately.

254 There shall be no malfunction.

255 Following the overload test, the endurance test shall be performed on the same samples, under
256 the same test conditions and at the rated switching current. For CO contact the endurance test
257 shall be performed at the same time.