



SLOVENSKI STANDARD
oSIST prEN IEC 61810-7-40:2023
28-september-2023

Električni releji - Preskusi in meritve -7-40. del: Kratkostično testiranje

Electrical relays - Tests and Measurements - Part 7-40: Short circuit testing

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Ta slovenski standard je istoveten z: prEN IEC 61810-7-40:2023

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 94 : ELECTRICAL RELAYS	
SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 121, SC 121A	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
<p>Attention IEC-CENELEC parallel voting</p> <p>The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.</p> <p>https://standards.iteh.ai/catalog/standards/sist/ab842d8b-e4d6-4a0b-94f1-120000000000/pr-en-iec-61810-7-40-2023</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

Electrical relays – Tests and Measurements – Part 7-40: Short circuit testing

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Electrical relays –
Tests and Measurements**
Part 7-40: Short circuit testing**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	Report on voting
94/835/CD	94/458/RVD

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.

63 This International Standard is to be used in conjunction with IEC 61810-1:2015.

64 The committee has decided that the contents of this document will remain unchanged until the
65 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to
66 the specific document. At this date, the document will be

- 67 • reconfirmed,
- 68 • withdrawn,
- 69 • replaced by a revised edition, or
- 70 • amended.

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Electrical relays – Tests and Measurements

Part 7-40: Short circuit testing

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80 **1 Scope**

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

84 The object of this test is to define a standard test method for short circuit testing.

85 **2 Normative references**

86 The following documents are referred to in the text in such a way that some or all of their content
87 constitutes requirements of this document. For dated references, only the edition cited applies.
88 For undated references, the latest edition of the referenced document (including any
89 amendments) applies.

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

92 ISO 16750-1:2018, *Road vehicles – Environmental conditions and testing for electrical and*
93 *electronic equipment – Part 1: General*

94 ISO 16750-2:2012, *Road vehicles – Environmental conditions and testing for electrical and*
95 *electronic equipment – Part 2: Electrical loads*

96 **3 Terms and definitions**

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

98 **3.1**

99 **Short Circuit Protective Device (SCPD)**

100 protective device, specified by the manufacturer, which has to be installed in the circuit in series
101 with the device under test () in order to protect it against short-circuits only to cut the current

102 [SOURCE: IEC 60050-442:2010, 442-05-12, modified – modification of the definition]

103 **3.2**

104 **Control Switch (CS)**

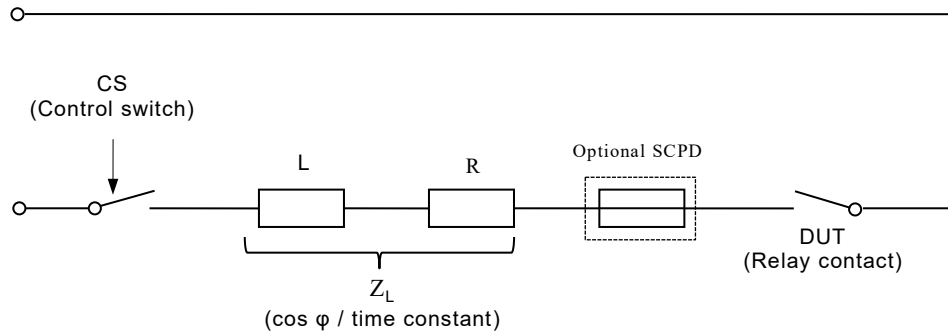
105 Device which is capable to connect and disconnect the short circuit under safe conditions to
106 ensure full disconnection.

107

108 4 Test procedure

109 4.1 Purpose

110 The test shall evaluate the relay short circuit capacity.



Z_L : Impedance

L: Inductance

R: Resistance

NOTE 1 SCPD is short-circuit protective device (e.g. fuse). The cut off could be more sensitive than the main SCPD (defined by the application or by the manufacturer).

NOTE 2 The optional SCPD and $\cos \phi$ / time constant are required by application standards or defined by the manufacturer

NOTE 3 It is advisable to measure the maximum arcing time by relay manufacturer.

111 **Figure 1 - Standard short-circuit capacity test circuit**

113

114 4.2 Procedure

115 4.2.1 General

116 The relay shall withstand the stress generated from the short-circuit current under the
117 conditions specified by the manufacturer.

118 The relay under test (DUT) shall be in a new and clean condition, mounted as in service or
119 specified by the manufacturer. The test arrangement is shown in Figure 1.

120 The details of the specified short-circuit protective (SCPD) device shall be stated by the
121 manufacturer.

122 The test shall be performed under reference conditions given in Clause 4.4 of IEC 61810-7-0.

123 The operate energization of the test coil shall be at rated operate value unless otherwise stated
124 by the manufacturer. Any deviation shall be stated in the manufacturer documentation e.g. test
125 report, datasheet and so on.

126 The wiring of the short circuit shall have at least the cross-section for the nominal current in
127 accordance to clause 4.9 of IEC 61810-7-0. In case that the resistance of the short circuit loop
128 is too high to reach the requested short circuit current a higher cross-section shall be chosen.

129 The Short Circuit Protective Device (SCPD) of the power source (including the primary and
130 secondary protective devices) shall ensure that the short circuit prospective current could flow
131 uninfluenced at least four half waves for AC or 20 ms for DC for the calibration shot.

132

133 4.2.2 Preconditioning

134 The relay may be preconditioned several times before test, at no load or at any current not
135 exceeding the rated current. The preconditioning (if any) shall be mentioned in the test record.

136 4.2.3 Test circuit calibration

137 For the circuit calibration the DUT shall be bridged as close as possible to the DUT. However,
138 the bridge shall have the same length and cross-section as the bridged wiring path.

139 The current form shall be recorded and shall be part of the test record.

140 4.2.4 Test procedure and/or sequence

141 The procedure and/or sequence shall be selected in accordance with the application. However,
142 the DUT shall be operated and monitored in accordance with Figure 2 of IEC 61810-0.

143 Examples for typical sequences are given as followed:

- 144 • SCPD is used:
 - 145 – CS closed → DUT make into fault condition → SCPD break
 - 146 – DUT is closed, → make is carried out by CS → SCPD break
- 147 • No SCPD is present
 - 148 – DUT is closed → make and break is carried out by CS for a specific time
 - 149 – DUT make into fault condition; break is carried out by control switch after a specific time
 - 150 – DUT is closed, make is carried out by control switch, break is carried out by DUT after
 - 151 a specific time
- 152 • DUT has SCPD functions
 - 153 – DUT make into and break fault condition
 - 154 – DUT is closed, make is carried out by control switch, DUT with SCPD function break

155 And maybe combinations out of these.

156 Unless otherwise specified, the short-circuit current shall applied at least 3 times on the same
157 DUT and the time between each shoot shall be not less than 60s.

158 NOTE In case that a SCPD was used and must be renewed for the next shoot the time could be potentially much
159 longer as.

160 For each test a new sample could be used.

161 4.3 Test conditions

162 The application (standard) specifies the following conditions:

- 163 • Test sequence
- 164 • Number of test samples;
- 165 • energization conditions: if other than the rated coil voltage;
- 166 • polarity of contact;
- 167 • test voltage;
- 168 • test current;
- 169 • short-circuit current time;

- 170 • Number of applied short circuit current
171 • Used SCPD (specification of the SCPD), if applicable

172 **5 Evaluation**

173 After the short-circuit test, the relay shall fulfil the requirements given by the application
174 standard or defined by the manufacturer.

175 As example: after the short circuit test the DUT shows no function (like: operate and / or
176 release) anymore but enclosure is undamaged (no life parts are touchable):

177 If basic insulation is required, dielectric test according to IEC 61810-7-4 is required.

178 The test conditions shall be mentioned in the test report. If the test conditions are valid for all
179 products/applications, then the test conditions shall be added to the datasheet/specification.

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