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SECRETARIAT: Austria	SECRETARY: Mr Bernhard Spalt
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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TITLE:

Electrical relays – Tests and Measurements – Part 7-8: Timing

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL RELAYS – Tests and measurements**Part 7-8: Timing****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
94/856/CD	94/910/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

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

- 71 • reconfirmed,
- 72 • withdrawn,
- 73 • replaced by a revised edition, or
- 74 • amended.

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ELECTRICAL RELAYS – Tests and measurements**Part 7-8: Timing****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 a standard test method to ensure that the relay times are within the specified limits.

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 61812-1:2011, *Time relays for industrial and residential use - Part 1: Requirements and tests*

[oSIST prEN IEC 61810-7-8:2023](https://standards.iteh.ai/catalog/standards/sist/a15f6486-eb86-4af5-91fd-8c5b5a0feb3d/osist-pren-iec-61810-7-8-2023)

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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 electromechanical elementary relays**3.1.1****Operate / set time**

time interval between the application of the specified input voltage to a relay in the release condition and the change of state of the last output circuit, bounce time not included

[IEC 60050-444:2010, 444-05-01 modified]

3.1.2**release time**

time interval between the removal of the specified input voltage from a monostable relay in the operate condition and the change of state of the last output circuit, bounce time not included

[IEC 60050-444:2002, 444-05-02]

3.1.3**reset time**

time interval between the application of the specified input voltage to a bistable relay in the operate condition and the change of state of the last output circuit, bounce time not included

[IEC 60050-444:2002, 444-05-03]

- 123 **3.1.4**
124 **bounce time**
125 for a contact which is closing/opening its circuit, time interval between the instant when the contact
126 circuit first closes/opens and the instant when the circuit is finally closed/opened
127
128 [IEC 60050-444:2002, 444-05-04]
- 129 **3.1.5**
130 **bridging time**
131 for a change-over make-before-break contact, time interval during which both contact circuits are
132 closed
133
134 [IEC 60050-444:2002, 444-05-05]
- 135 **3.1.6**
136 **transfer time**
137 for a change-over break-before-make contact, time interval during which both contact circuits are open
138
139 [IEC 60050-444:2002, 444-05-06]
- 140 **3.1.7**
141 **stabilization time**
142 time interval between the instant when a specified input voltage is applied to an electromechanical
143 relay and the instant when the last output circuit is closed/opened and fulfils the specified
144 requirements, bounce time included
145
146 [IEC 60050-444:2002, 444-05-07]
- 147 **3.1.8**
148 **minimum time of energization (for operation)**
149 minimum duration of the input voltage to ensure that the relay operates or resets
150
151 [IEC 60050-444:2002, 444-05-08]
- 152
153 **3.1.9**
154 **contact time difference**
155 difference between operating times of 2 or more contacts in a multipole relay
156
- 157 **3.2 Terms and definitions related to time relays**
- 158 **3.2.1**
159 **specified time**
160 specified characteristic of a time relay at given type of function, e.g. operate time, release time,
161 pulse on time, interval time

162 [IEC 60050-445:2010, 445-05-01]
- 163
164 **3.2.2**
165 **effect of influence** (on specified time)
166 degree with which the influence quantity within its nominal range has an effect on the specified
167 time

168 [IEC 60050-445:2010, 445-06-02]
- 169
170 **3.2.3**
171 **setting accuracy**
172 difference between the measured value of the specified time and the reference value set on the
173 scale

174 NOTE For analogue setting this value relates to the maximum setting value.
175 [IEC 60050-445:2010, 445-06-07]

176 **3.2.4**
 177 **repeatability**
 178 difference between the upper and lower limits of the specified confidence range determined
 179 from several time measurements of a time relay under identical conditions

180 NOTE Preferably the repeatability is indicated as a percentage of the mean value of all measured values.
 181 [IEC 60050-445:2010, 445-06-08]

182 **3.2.5**
 183 **recovery time**
 184 minimum time interval for which the power supply is removed or control signal is applied or
 185 removed before the specified function can be performed again

186 [IEC 60050-445:2010, 445-05-04]

187 **3.2.6**
 188 **minimum control impulse time**
 189 shortest duration of the power supply or control signal to fulfil the specified function

190 [IEC 60050-445:2010, 445-05-02]

191 **4 Testing procedure**

192 **4.1 Timing tests for elementary relays**

193 **4.1.1 Purpose**

194 These tests are applicable to all elementary relays, in order to ensure that the relay times are
 195 within the specified limits. These tests can be used:

- 196 1. for statistical evaluation of the behavior of a relay type
- 197 2. for confirmation of the specification of a single relay or when the application requires
 198 time within fixed limits

199 **4.1.2 Procedure**

200 For the energization of the coil, the output impedance of the source shall be chosen to ensure
 201 that the maximum voltage drop and the setting time do not exceed the values prescribed.

202 The switch for switching the coil shall be bounce-free.

203 For AC coil relays, a synchronous switching device, variable in point on wave, shall be used.
 204 The trigger delay angle of the sinewave shall be set either to obtain the maximum time interval,
 205 or to the specified points on wave, as prescribed. As an alternative, when just a reference value
 206 is needed, a DC energization of the coil with a value that causes equivalent power or ampere
 207 turns of the coil may be used.

208 The contact load shall be resistive, the switching voltage shall be as prescribed, the switching
 209 current shall be 1 mA for CC0, 10 mA for CC1, 100 mA for CC2, unless otherwise specified.

210 For the measurement of operate time, transfer time, bridging time, release time and bounce
 211 time, a suitable circuit is given in Figure 1, and typical traces on the oscilloscope screen are
 212 shown in Figure 2.

213 Before starting the test, the samples to be measured will be preconditioned in the measurement room
 214 for a period of at least 2 hours.

215
 216

217

218 4.1.2.1 Statistical evaluation of a relay type

219 A minimum of 5 relays of equivalent construction will be measured in order to get a general estimation;
220 more precise values should be derived from a statistical analysis on a larger number of samples

221 All the (minimum) 5 relays will be measured, and on each relay at least 5 consecutive measurements
222 will be performed and recorded, leaving time enough for coil cooling after any energization.

223

224 For defining the nominal value of each time, all the values (minimum $5 \times 5 = 25$) will be considered; the
225 average and the standard deviation of all the values will be calculated.

226

227 4.1.2.2 Single relay or single event measurement

228

229 In such case, of course a single relay will be measured

230

231

232 4.1.3 Conditions

233 The conditions to be specified are the following:

234 a) mounting position of the relay;

235 b) coil voltage value, cycling rate and duty factor of the energization. Preferably, the lower limit
236 of the operative range should be used for testing the operate time, and the upper limit for
237 testing the release time; in case of bistable relays, set and reset values have to be specified

238 c) means for the disconnection for release time measurement, if of importance. Short-circuiting
239 the relay coil while protecting the power supply source from overload may be specified as
240 an alternative;

241 d) maximum voltage drop and setting time of the source;

242 e) contact category, switching voltage and switching current;

243 f) times to be measured, their limits and contact sequencing;

244 g) for AC coil relays, the trigger delay angle of the sinewave (e.g. 0° , 45° , 90°) ;

245 h) contact(s) to be checked;

246 i) discontinuities to be ignored if limit other than $10 \mu\text{s}$;

247 j) suppression components on coil or contact, if required;

248 k) number of relays tested.

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