



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60127-9:2024**  
**01-oktober-2024**

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**Miniaturne varovalke - 9. del: Miniaturni taljivi vložki za posebne namene z delno izklopno zmogljivostjo**

Miniature fuses - Part 9: Miniature fuse-links for special applications with partial-range breaking capacity

Coupe-circuits miniatures - Partie 9: éléments de remplacement miniatures pour applications spéciales à pouvoir de coupure partiel

**Ta slovenski standard je istoveten z: prEN IEC 60127-9:2024**

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**ICS:**

29.120.50	Varovalke in druga nadtokovna zaščita	Fuses and other overcurrent protection devices
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TITLE:

**IEC 60127-9/Ed.1: Miniature fuses – Part 9: Miniature fuse-links for special applications with partial-range breaking capacity**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## MINIATURE FUSES –

**Part 9: Miniature fuse-links for special applications with partial-range breaking capacity**

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## INTRODUCTION

79

80 According to the wish expressed by the users of miniature fuses, all standards, recommendations and  
81 other documents relating to miniature fuses should have the same publication number in order to  
82 facilitate reference to fuses in other specifications, for example, equipment specifications.

83 Furthermore, a single publication number and subdivision into parts would facilitate the establishment  
84 of new standards, because clauses containing general requirements need not be repeated.

85 The IEC 60127 series, under the general heading *Miniature fuses*, is thus subdivided as follows:

86 IEC 60127-1, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for*  
87 *miniature fuse-links*

88 IEC 60127-2, *Miniature fuses – Part 2: Cartridge fuse-links*

89 IEC 60127-3, *Miniature fuses – Part 3: Sub-miniature fuse-links*

90 IEC 60127-4, *Miniature fuses – Part 4: Universal modular fuse-links (UMF) – Through-hole and surface*  
91 *mount types*

92 IEC 60127-5, *Miniature fuses – Part 5: Guidelines for quality assessment of miniature fuse-links*

93 IEC 60127-6, *Miniature fuses – Part 6: Fuse-holders for miniature fuse-links*

94 IEC 60127-7, *Miniature fuses – Part 7: Miniature fuse-links for special applications*

95 IEC 60127-8, *Miniature fuses – Part 8: Fuse resistors with particular overcurrent protection*

96 IEC 60127-9, *Miniature fuses – Part 9: Miniature fuse-links for special applications with partial-range*  
97 *breaking capacity*

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98 IEC 60127-10, *Miniature fuses – Part 10: User guide for miniature fuses*

99

100

## MINIATURE FUSES –

### Part 9: Miniature fuse-links for special applications with partial-range breaking capacity

#### 1 Scope

This part of IEC 60127 covers requirements for miniature fuse-links for special applications-with partial-range breaking capacity.

This part of IEC 60127 is applicable to fuse-links with a rated voltage not exceeding 1 000 V, a rated current not exceeding 150 A and a rated breaking capacity not exceeding 50 kA.

Miniature fuse-links with partial-range breaking capacity are used only to operate under short circuit conditions. They cannot be applied under overload conditions.

The design engineer needs to ensure no overload conditions can be seen by the fuse approved under IEC 60127-9.

This part of IEC 60127 does not apply to fuses completely covered by IEC 60127-7 as well as the subsequent parts of IEC 60269-1.

It does not apply to miniature fuse-links for appliances intended to be used under special conditions, such as in corrosive or explosive atmospheres.

This part of IEC 60127 applies in addition to the requirements of IEC 60127-1.

Miniature fuse-links for special applications with partial-range breaking capacity are not intended to be replaced by the end-user of an electrical / electronic appliance.

The object of this part of IEC 60127 is to establish uniform test methods for miniature fuse-links for special applications with partial-range breaking capacity, so as to allow verification of the values (for example melting time and breaking capacity values) specified by the manufacturer.

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-21:2006, *Environmental testing – Part 2-21: Tests – Test U: Robustness of terminations and integral mounting devices*

IEC 60127-1:2023, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60127-4:2005, *Miniature fuses – Part 4: Universal modular fuse-links (UMF) – Through-hole and surface mount types*

IEC 60127-4:2005/AMD1:2008

IEC 60127-4:2005/AMD2:2012

IEC 60127-6:2023, *Miniature fuses – Part 6: Fuse-holders for miniature fuse-links*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

142 IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-*  
 143 *wire flammability index (GWFI) test method for materials*  
 144 IEC 60695-2-12:2010/AMD1:2014

145 IEC 60695-2-13:2010, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-*  
 146 *wire ignition temperature (GWIT) test method for materials*  
 147 IEC 60695-2-13:2010/AMD1:2014

148 IEC 60695-4:2012, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical*  
 149 *products*

150 IEC 61249-2-7:2002, *Materials for printed boards and other interconnecting structures – Part 2-7:*  
 151 *Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined*  
 152 *flammability (vertical burning test), copper-clad*

153 ISO 3:1973, *Preferred numbers – Series of preferred numbers*

### 154 3 Terms and definitions

155 For the purposes of this document, the terms and definitions given in Clause 3 of IEC 60127-1:2023,  
 156 except 3.5, as well as the following apply.

157 Note 1 to entry:

158 ISO and IEC maintain terminological databases for use in standardization are at the following addresses:

- 159 • IEC Electropedia: available at <http://www.electropedia.org/>
- 160 • ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 161 3.1

##### 162 miniature fuse-link for special applications with partial-range breaking capacity

163 enclosed fuse-link which is not covered in IEC 60127-2, IEC 60127-3, IEC 60127-4 or IEC60127-7 and  
 164 of rated breaking capacity not exceeding 50 kA, with a width and height or diameter not exceeding  
 165 12 mm and a length not exceeding 50 mm

166 Note 1 to entry: Special precautions may be necessary to ensure that the fuse-links will be replaced by a fuse-link with the  
 167 same technical parameters.

168 Note 2 to entry: For fuse-links having a metallic cap at each end, any member of terminals or terminations other than the  
 169 metallic cap such as wire terminations, pins and bolt-in contacts may not be included in the total length of 50 mm and the  
 170 width and height or diameter not exceeding 12 mm.

#### 171 3.2

##### 172 $t_1$ to $t_6$

173 limit values for time/current characteristic

#### 174 3.3

##### 175 $I_{70}$

176 test current for testing at elevated temperature of 70 °C

177 Note 1 to entry: Preferred values are 0,8  $I_N$  or 1,0  $I_N$  or 1,1  $I_N$ .

#### 178 3.4

##### 179 $I_{\text{test}}$ (A)

180 test current for endurance testing according to method A

181 Note 1 to entry: Preferred values are 1,0  $I_N$  or 1,05  $I_N$  or 1,2  $I_N$ .

#### 182 3.5

##### 183 $I_{\text{test}}$ (B)

184 test current for endurance testing according to method B



185 Note 1 to entry: Preferred values are 0,8  $I_N$  or 1,0  $I_N$ .

### 186 3.6

#### 187 $I_{OVL}$ (A)

188 test current for measuring the maximum sustained dissipation according to method A

189 Note 1 to entry: Preferred values are 1,25  $I_N$  or 1,35  $I_N$  or 1,5  $I_N$ .

### 190 3.7

#### 191 $I_{OVL}$ (B)

192 test current for measuring the maximum sustained dissipation according to method B

193 Note 1 to entry: Preferred values are 1,0  $I_N$  or 1,25  $I_N$ .

### 194 3.8

#### 195 minimum breaking current $I_{min}$

196 minimum value of prospective current that a fuse-link is capable of breaking at a stated voltage under  
197 prescribed conditions of use and behaviour and that is defined as:

$$198 2,1 I_N < I_{min} \leq 4 I_N$$

199

200 Note 1 to entry:

201 The value of  $I_{min}$  is defined by the manufacturer.

202

## 203 4 General requirements

204 Clause 4 of IEC 60127-1:2023 applies.

## 205 5 Standard ratings

206 Clause 5 of IEC 60127-1:2023 does not apply.

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207 *Replacement:*

208 The following ratings shall be agreed upon between the testing house and the manufacturer:

- 209 – rated voltage;
- 210 – rated current (see standard sheet 1 for preferred ratings);
- 211 – rated breaking capacity (a.c. and/or d.c.);
- 212 – minimum breaking current  $I_{min}$  (a.c. and/or d.c.)
- 213 – time/current characteristic

214 The following may be agreed upon on an optional basis:

- 215 – test at elevated temperature;
- 216 – time/current characteristic (additional optional currents not required or defined by this standard).

217 Any additional specified values are given in standard sheet 1.

## 218 6 Marking

219 Clause 6 of IEC 60127-1:2023 applies except as follows.

### 220 6.1

221 *Replacement:*

222 d) Not applicable.

223 NOTE A symbol denoting the time/current characteristic cannot be stated, because this part of IEC 60127 does not specify  
224 any values for this parameter.

225 *Addition:*

226 e) Type designation.

227 f) Rated breaking capacity in amperes (A) or in kilo amperes (kA).

228 g) minimum breaking current.

229 **6.2**

230 *Deletion of NOTE 2.*

231 **6.3**

232 *Addition after first paragraph:*

233 Furthermore the rated breaking capacity in amperes (A) or in kilo amperes (kA) shall be marked on the  
234 package label as well as the minimum breaking current ( $I_{min}$ ).

235 **6.4**

236 *Addition of heading title and replacement of text:*

237 **6.4 Colour coding for miniature fuse-links for special applications**

238 Marking of fuse-links by means of colour bands according to IEC 60127-1:2023, Annex A, is not  
239 permitted. It is, however, possible to use colour markings that clearly differ from this colour band  
240 system. In this case, the manufacturer shall provide the relevant information, for example colour key-

241 *Additional subclause:*

242 **6.101** Where marking is impracticable due to space limitations, the relevant information should appear  
243 on the smallest package and in the manufacturer's technical literature.

244 **7 General notes on tests**

245 Clause 7 of IEC 60127-1:2023 applies except as follows.

246 **7.2 Type tests**

247 **7.2.1**

248 *Replacement:*

249 For testing the individual current ratings of fuses with a.c. or d.c. breaking capacity, the number of  
250 fuse-links required is 48, of which 12 are kept as spares. For fuse-links with wire terminations six extra  
251 samples (E1 to E6) have to be taken by random and not sorted according to voltage drop. If necessary,  
252 these samples can be used as additional spares after performing the tests according to 8.3.

253 The testing schedule is shown in Table 2.

254 For testing the individual current ratings of fuses with a.c. and d.c. breaking capacity, the number of  
255 fuse-links required is 60, of which 9 are kept as spares. For fuse-links with wire terminations six extra  
256 samples (E1 to E6) have to be taken by random and not sorted according to voltage drop. If necessary,  
257 these samples can be used as additional spares after performing the tests according to 8.3.

258 The testing schedule is shown in Table 3.

259 For testing the maximum ampere rating of a homogenous series with a.c. or d.c. breaking capacity the  
260 number of fuse-links required is 51, of which 22 are kept as spares. For fuse-links with wire  
261 terminations six extra samples (E1 to E6) have to be taken by random and not sorted according to  
262 voltage drop. If necessary, these samples can be used as additional spares after performing the tests  
263 according to 8.3.

264 The testing schedule is shown in Table 4.

265 For testing the maximum ampere rating of a homogenous series with a.c. and d.c. breaking capacity  
266 the number of fuse-links required is 63, of which 32 are kept as spares. For fuse-links with wire  
267 terminations six extra samples (E1 to E6) have to be taken by random and not sorted according to  
268 voltage drop. If necessary, these samples can be used as additional spares after performing the tests  
269 according to 8.3.

270 The testing schedule is shown in Table 5.

271 For testing the minimum ampere rating of a homogenous series with a.c. and / or d.c. breaking capacity  
272 the number of fuse-links required is 38, of which 16 are kept as spares.

273 The testing schedule is shown in Table 6.

274 For testing all of the intermediate ampere rating of a homogenous series with a.c. and / or d.c. breaking  
275 capacity the number of fuse-links required is 38, of which 16 are kept as spares.

276 The testing schedule is shown in Table 7.

### 277 **7.3 Fuse-bases for tests**

278 *Addition after first paragraph:*

279 For fuse-links designed for use in a special type of fuse-holder, testing shall be performed in that fuse-  
280 holder.

281 For tests that require a printed circuit board for mounting and connection of the fuse-links, a test board  
282 according to Figure 1 or Figure 2 shall be used.

283 The test board according to Figure 1 shall be used for fuse links with wire terminations intended for  
284 insertion in suitably designed holes or sockets.

285 The test board according to Figure 2 shall be used for surface mount fuse-links.

286 When two or more fuse-links are tested in series, the fuse-bases shall be located so that there will be a  
287 spacing of not less than 50 mm between any two fuse-links under testing. The conductor connecting  
288 the fuse-bases together, and connecting the fuse-bases to the ammeter and the source of supply shall  
289 be insulated copper wire. The length of each conductor shall be 500 mm and the cross-sectional area  
290 of the wire shall be approximately 1 mm<sup>2</sup> for fuse-links with rated currents up to and including 6,3 A,  
291 and 6 mm<sup>2</sup> for rated currents exceeding 6,3 A to 25A and 10 mm<sup>2</sup> for rated currents exceeding 25 A.