

Miniature fuses —

Part 6: Fuse-holders for miniature cartridge fuse-links

The European Standard EN 60127-6:1994, with the incorporation of amendments A1:1996 and A2:2003, has the status of a British Standard

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Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the national committees of the following countries:

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National foreword

This British Standard has been prepared by Subcommittee PEL/32/3 (formerly PEL/78/3). It is the official English language version of EN 60127-6:1994 *Miniature fuses — Part 6: Fuse-holders for miniature cartridge fuse-links*, including amendments A1:1996 and A2:2003, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 60127-6:1994 including amendments 1:1996 and 2:2002, published by the International Electrotechnical Commission (IEC).

This British Standard is one of a series. The other Parts, which together superseded BS 4265 in 1991, are as follows.

BS EN 60127-1, *Definitions for miniature fuses and general requirements for miniature fuse-links*.

BS EN 60127-2, *Specification for cartridge fuse-links*.

BS EN 60127-3, *Specification for sub-miniature fuse-links*.

BS EN 60127-5, *Guide for the quality assessment of miniature fuse links*.

It is expected that IEC 60127-4 will be approved by CENELEC as EN 60127-4.

For the purposes of this British Standard, any references to IEC page numbers in the text should be ignored.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 45 and a back cover.

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Miniature fuses — Part 6: Fuse-holders for miniature cartridge fuse-links

(includes amendment A1:1996 and A2:2003)
(IEC 60127-6:1994 + A1:1996 + A2:2002)

Coupe-circuit miniatures —
Partie 6: Ensembles-porteurs pour cartouches
de coupe-circuit miniatures
(inclut les amendement A1:1996 et A2:2003)
(CEI 60127-6:1994 + A1:1996 + A2:2002)

Geräteschutzsicherungen —
Teil 6: G-Sicherungshalter für
G-Sicherungseinsätze
(enthält Änderungen A1:1996 und A2:2003)
(IEC 60127-6:1994 + A1:1996 + A2:2002)

This European Standard was approved by CENELEC on 1993-07-06. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of documents 32C(CO)71 and 71A, as prepared by Subcommittee 32C: Miniature fuses, of IEC Technical Committee 32: Fuses, was submitted to the IEC-CENELEC parallel vote in August 1992.

The reference document was approved by CENELEC as EN 60127-6 on 6 July 1993.

This European Standard replaces EN 60257:1990.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1995-04-01
- latest date of withdrawal of conflicting national standards (dow) 1995-04-01

For products which have complied with EN 60527:1990 before 1995-04-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-04-01.

Annexes designated “normative” are part of the body of the standard. Annexes designated “informative” are given only for information. In this standard, Annex A, Annex B and Annex ZA are normative and Annex C, Annex D and Annex E are informative.

Foreword to amendment A1

The text of document 32C/152/FDIS, future amendment 1 to IEC 60127-6:1994, prepared by SC 32C, Miniature fuses, of IEC TC 32, Fuses, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60127-6:1994 on 1996-03-05.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1996-12-01

For products which have complied with EN 60127-6:1994 before 1996-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-12-01.

Annexes designated “normative” are part of the body of the standard. In this standard, Annex ZA is normative. Annex ZA has been added by CENELEC.

Foreword to amendment A2

The text of document 32C/320/FDIS, future amendment 2 to IEC 60127-6:1994, prepared by SC 32C, Miniature fuses, of IEC TC 32, Fuses, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 60127-6:1994 on 2003-02-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-11-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2006-02-01

Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given for information only.

In this standard Annex A, Annex B and Annex ZA are normative and Annex E is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of amendment 2:2002 to the International Standard IEC 60127-6:1994 was approved by CENELEC as an amendment to the European Standard without any modification.

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Introduction

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

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

The new IEC 60127 series is thus subdivided as follows:

IEC 60127, *Miniature fuses* (general title).

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

IEC 60127-2, *Part 2: Cartridge fuse-links*.

IEC 60127-3, *Part 3: Sub-miniature fuse-links*.

IEC 60127-4, *Part 4: Universal modular fuse-links (UMF)*.

IEC 60127-5, *Part 5: Guidelines for quality assessment of miniature fuse-links*.

IEC 60127-6, *Part 6: Fuse-holders for miniature cartridge fuse-links*.

IEC 60127-7, (Free for further documents).

IEC 60127-8, (Free for further documents).

IEC 60127-9, *Part 9: Test-holders and test circuits*.

IEC 60127-10, *Part 10: User guide*.

This Part of IEC 60127 covers requirements, test equipment and test methods for fuse-holders. It is a self-standing document, which refers back to Part 1 with regard to certain definitions and the atmospheric conditions for test. It also makes reference to other parts of IEC 60127 with regard to dimensions and maximum power losses of fuse-links.

1 Scope and object

1.1 This Part of IEC 60127 is applicable to fuse-holders for miniature cartridge fuse-links according to IEC 60127-2 and sub-miniature fuse-links according to IEC 60127-3 for the protection of electric appliances, electronic equipment and component parts thereof, normally intended for use indoors. Examples of fuse-holder types with different features are given in Table 1.

Table 1 — Features of unexposed or exposed fuse-holders

1	<i>Types of mounting</i>
1.1	Panel and base mounting
1.2	Printed circuit board mounting
2	<i>Methods of fastening</i>
2.1	Methods of fastening on panel:
2.1.1	Fixing nut fastening (threaded nut)
2.1.2	Snap-in fastening:
2.1.2.1	Fuse-base with an integral spring system
2.1.2.2	Fuse-base with a separate spring-nut (a nut fabricated, e.g. from thin spring steel having an impression designed to accommodate the mating part)
2.2	Methods of fastening on printed circuit (PC) board:
2.2.1	Solder fastening
2.2.2	Plug-in fastening
3	<i>Methods of insertion of the fuse-carrier into the fuse base</i>
3.1	Screw insertion
3.2	Bayonet insertion
3.3	Plug-in insertion
4	<i>Types of terminals</i>
4.1	Screw terminals
4.2	Solder terminals
4.3	Quick connect terminals
4.4	Other solderless terminals: — crimp terminals — wire wrap terminals
5	<i>Protection against electric shock</i>
5.1	Fuse-holder without integral protection against electric shock
5.2	Fuse-holder with integral protection against electric shock
5.3	Fuse-holder with enhanced integral protection against electric shock
NOTE This list is not intended to be comprehensive and fuse-holders which are not listed are not necessarily excluded from the scope.	

This standard applies to fuse-holders with:

- a maximum rated current of 16 A; and
- a maximum rated voltage of 1 500 V d.c. or 1 000 V a.c.; and
- for use up to 2 000 m above sea-level, unless otherwise specified.

1.2 The object of this standard is to establish uniform requirements for safety and the assessment of electrical, mechanical, thermal and climatic properties of fuse-holders and the compatibility between fuse-holders and fuse-links.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60127. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60127 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

- IEC 60050(441):1984, *International Electrotechnical Vocabulary (IEV) — Chapter 441: Switchgear, controlgear and fuses*.
- IEC 60060050(581):1978, *International Electrotechnical Vocabulary (IEV) — Chapter 581: Electromechanical components for electronic equipment*.
- IEC 60060-1:1989, *High-voltage test techniques — Part 1: General definitions and test requirements*.
- IEC 60060-3:1976, *High-voltage test techniques — Part 3: Measuring devices*.
- IEC 60060-4:1977, *High-voltage test techniques — Part 4: Application guide for measuring devices*.
- IEC 60068-1:1988, *Environmental testing — Part 1: General and guidance*.
- IEC 60068-2, *Environmental testing — Part 2: Tests*.
- IEC 60068-2-1:1990, *Environmental testing — Part 2: Tests — Section 1: Tests A: Cold*.
- IEC 60068-2-2:1974, *Environmental testing — Part 2: Tests — Section 2: Tests B: Dry heat*.
- IEC 60068-2-3:1969, *Environmental testing — Part 2: Tests — Section 3: Test Ca: Damp heat, steady state*.
- IEC 60068-2-6:1982, *Environmental testing — Part 2: Tests — Section 6: Test Fc and guidance: Vibration (sinusoidal)*.
- IEC 60068-2-20:1979, *Environmental testing — Part 2: Tests — Section 20: Test T: Soldering*.
- IEC 60068-2-21:1983, *Environmental testing — Part 2: Tests — Section 21: Test U: Robustness of terminations and integral mounting devices*.
- IEC 60068-2-27:1987, *Environmental testing — Part 2: Tests — Section 27: Test Ea and guidance: Shock*.
- IEC 60068-2-45:1980, *Environmental testing — Part 2: Tests — Section 45: Test XA and guidance: Immersion in cleaning solvents*.
- IEC 60068-2-47:1982, *Environmental testing — Part 2: Tests — Section 47: Mounting of components, equipment and other articles for dynamic tests including shock (Ea), bump (Eb), vibration (Fc and Fd) and steady-state acceleration and guidance*.
- IEC 60112:1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*.
- IEC 60127-2:1989, *Miniature fuses — Part 2: Cartridge fuse-links*.
- IEC 60127-3:1988, *Miniature fuses — Part 3: Sub-miniature fuse-links*.
- IEC 60216-1:1990, *Guide for the determination of thermal endurance properties of electrical insulating materials — Part 1: General guidelines for ageing procedure and evaluation of test results*.
- IEC 60260:1968, *Test enclosures of non-injection type for constant relative humidity*.
- IEC 60291:1969, *Fuse definitions*.
- IEC 60291A:1975, *First supplement*.
- IEC 60364-4-443:1990, *Electrical installations of buildings — Part 4: Protection for safety — Chapter 44: Protection against overvoltages — Section 443: Protection against overvoltages of atmospheric origin or due to switching*.
- IEC 60512-8:1993, *Electromechanical components for electronic equipment; basic testing procedures and measuring methods — Part 8: Connector tests (mechanical) and mechanical tests on contacts and terminations*.
- IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*.

IEC 60664-1:1992, *Insulation co-ordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests.*

IEC 60695-2-2:1991, *Fire hazard testing — Part 2: Test methods — Section 2: Needle-flame test.*

IEC 60760:1989, *Flat, quick-connect terminations.*

IEC 60817:1984, *Spring-operated impact-test apparatus and its calibration.*

IEC 60999-1:1999, *Connecting devices — Electrical copper conductors — Safety requirements for screw-type and screwless-type clamping units — Part 1: General requirements and particular requirements for conductors from 0,2 mm² up to 35 mm² (included).*

IEC 61140:2001, *Protection against electric shock — Common aspects for installation and equipment.*

IEC 61210:1993, *Connecting devices — Flat quick-connect terminations for electrical copper conductors — Safety requirements.*

ISO 3:1973, *Preferred numbers — Series of preferred numbers.*

ISO 1302:1992, *Technical drawings — Method of indicating surface texture.*

3 Definitions

For the definitions of general terms used in this standard, reference should be made to IEC 60050(441) and IEC 60050(581). International Electrotechnical Vocabulary (IEV), and to IEC 60664-1.

For definitions of terms relating to fuse-links, reference is made to IEC 60127-1, IEC 60291 and IEC 60291A.

For the purposes of this International Standard, the following definitions apply.

3.1 Fuse-holders

3.1.1

fuse-base

see 3.10 of IEC 60127-1

3.1.2

fuse-carrier

see 3.12 of IEC 60127-1

3.1.3

fuse-holder

combination of a fuse-base with its fuse-carrier

NOTE In some fuse-holder constructions where the fuse-base and the fuse-carrier are not separate parts the fuse-holder may consist of only the fuse-base and no fuse-carrier.

3.1.4

unexposed fuse-holder

fuse-holder with enclosed contacts

3.1.5

exposed fuse-holder

fuse-holder with exposed contacts (e.g. clips)

3.2

rating

see 3.16 of IEC 60127-1

3.3

rated power acceptance (of a fuse-holder)

value of power acceptance of a fuse-holder assigned by the manufacturer

NOTE This value is the maximum power dissipation produced by the inserted dummy fuse-link during testing, at the rated current tolerated by the fuse-holder without exceeding the specified temperatures.

The rated power acceptance is referred to an ambient temperature of 23 °C without exceeding the specified temperature.

3.4

rated current (of a fuse-holder)

value of current of a fuse-holder assigned by the manufacturer and to which the rated power acceptance is referred

3.5

rated voltage (of a fuse-holder)

value of voltage of a fuse-holder assigned by the manufacturer and to which operation and performance characteristics are referred

3.6

insulation co-ordination

the mutual correlation of insulation characteristics of electrical equipment taking into account the expected micro-environment and other influencing stresses

3.7

impulse withstand voltage

the highest peak value of impulse voltage of prescribed form and polarity which does not cause breakdown under specified conditions

3.8

overvoltage category

a numeral defining a transient overvoltage condition

specified categories, see **C.1**

3.9

pollution

any addition of foreign matter, solid, liquid, or gaseous that can result in a reduction of dielectric strength or surface resistivity of the insulation

3.10

pollution degree

a numeral characterizing the expected pollution of the micro-environment

specified degrees, see **C.2**

3.11

micro-environment

the immediate environment of the insulation which particularly influences the dimensioning of the creepage distances

3.12

clearance

the shortest distance in air between two conductive parts

3.13

creepage distance

the shortest distance along the surface of an insulating material between two conductive parts

3.14

solid insulation

solid insulating material interposed between two conductive parts

3.15

comparative tracking index (CTI)

the test for comparative tracking index in accordance with IEC 60112 is designed to compare the performance of various insulating materials under test conditions, namely drops of an aqueous contaminant falling on a horizontal surface leading to electrolytic conduction

material groups and their CTI values, see **C.3**

3.16

live part

a conductor or a conductive part intended to be energized in normal use

3.17

accessible part

accessible part or accessible surface denotes a part or surface which can be touched by means of the standard test finger according to IEC 60529, when the fuse-holder is installed and operated as in normal use, e.g. on the front panel of equipment

3.18

fuse-holder electric shock protection categories

a designation characterizing the level of the protection against electric shock of a fuse-holder

3.19

maximum ambient air temperature

the highest air temperature that a fuse-holder can endure at a power acceptance assigned by the manufacturer of the fuse-holder without exceeding the maximum allowable temperatures on the accessible and inaccessible surfaces of the fuse-holder

3.20

relative temperature Index

based on IEC 60216-1, it is the temperature index of a test material obtained from the time which corresponds to the known temperature index of a reference material when both materials are subjected to the same ageing and diagnostic procedures in comparative test

3.21

insulations

NOTE For detailed information, see IEC 61140 and IEC 60664-1.

3.21.1

functional insulation

insulation between conductive parts which is necessary only for the proper functioning of the equipment

3.21.2

basic insulation

insulation applied to live parts to provide basic protection against electric shock

NOTE Basic insulation does not necessarily include insulation used exclusively for functional purposes.

3.21.3

supplementary insulation

independent insulation applied in addition to basic insulation in order to provide protection against electric shock in the event of a failure of basic insulation

3.21.4

double insulation

insulation comprising both basic insulation and supplementary insulation

3.21.5

reinforced insulation

a single insulation system applied to live parts, which provides a degree of protection against electric shock equivalent to double insulation under the conditions specified in the relevant IEC standard

NOTE A single insulation system does not imply that the insulation must be one homogeneous piece. It may comprise several layers which cannot be tested singly as basic or supplementary insulation.

3.22

inaccessible part (inaccessible surface)

part or surface inside the equipment and which cannot be touched by means of the standard test finger according to IEC 60529

4 General requirements

Fuse-holders shall be so designed and constructed that in normal use, installed according to the manufacturer's instructions, their performance is reliable and without danger to the user or surroundings. In general, compliance is checked by carrying out all of the relevant tests specified.

5 Preferred standard ratings and classifications for fuse-holders

Table 2 — Values for standard ratings and classifications

No.	Preferred ratings and classifications for fuse-holders	For fuse-links according to	
		IEC 60127-2	IEC 60127-3
5.1	Rated voltage	250 V	125 V and 250 V
5.2	Rated current	6,3 A / 10 A	5 A
5.3	Rated power acceptance at an ambient temperature T_{A1} of 23 °C	1,6 W / 2,5 W/4 W	1,6 W / 2,5 W
5.4	Protection against electric shock referring to fuse-holder	Category PC1 Category PC2 Category PC3	
5.5	Protection against electric shock referring to equipment, according to IEC 61140	Class I or II	
5.6	Installation coordination according to IEC 60664-1: a) Overvoltage category b) Pollution degree c) Comparative tracking index CTI	II or III 2 or 3 CTI $\geq$ 150	
NOTE In reference to ratings (voltage, current, power acceptance), if other values are required, these values should be selected from the R10 series according to ISO 3. For classifications (No 5.6), other values may be specified.			

Complete information on ratings and classifications is given by the manufacturer according to Annex E.

6 Marking

Fuse-holders shall be marked with the name or trade mark of the manufacturer together with the catalogue or type reference.

The manufacturer may provide additional markings for the rated voltage in volts, the power acceptance in watts together with the rated current in amperes (./.), e.g. 250 V (4 W/6,3 A).

The additional marking shall not be placed on the front of the fuse-holder.

NOTE This is to prevent installation of a replacement fuse-link with the wrong rating.

The marking shall be indelible and easily legible.

Compliance is checked by inspection and by the test according to 6.2 in IEC 60127-1.

7 Clause deleted