IEC 60269-6

Edition 1.0 2010-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage fuses –
Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems

Fusibles basse tension –
Partie 6: Exigences supplémentaires concernant les éléments de remplacement utilisés pour la protection des systèmes d'énergie solaire photovoltaïque

IEC 60269-6:2010

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CONTENTS

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LOW-VOLTAGE FUSES –

Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60269-6 has been prepared by subcommittee 32B: Low-voltage fuses, of IEC technical committee 32: Fuses.

The text of this standard is based on the following documents:

FDIS	Report on voting
32B/561/FDIS	32B/569/RVD

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This part is to be used in conjunction with IEC 60269-1:2006, *Low-voltage fuses, Part 1: General requirements.*

This Part 6 supplements or modifies the corresponding clauses or subclauses of Part 1.

Where no change is necessary, this Part 6 indicates that the relevant clause or subclause applies.

Tables and figures which are additional to those in Part 1 are numbered starting from 101.

Additional annexes are lettered AA, BB, etc.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60269 series, under the general title: *Low-voltage fuses*, can be found on the IEC website.

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

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

LOW-VOLTAGE FUSES –

Part 6: Supplementary requirements for fuse-links for the protection of solar photovoltaic energy systems

1 General

IEC 60269-1 applies with the following supplementary requirements.

Fuse-links for the protection of solar photovoltaic (PV) energy systems shall comply with all requirements of IEC 60269-1, if not otherwise indicated hereinafter, and shall also comply with the supplementary requirements laid down below.

NOTE The abbreviation “PV” (photovoltaic) is used in this document.

1.1 Scope and object

These supplementary requirements apply to fuse-links for protecting PV strings and PV arrays in equipment for circuits of nominal voltages up to 1 500 V d.c.

Their rated voltage may be up to 1 500 V d.c.

NOTE 1 Such fuse-links are commonly referred to as “PV fuse-links”.

NOTE 2 In most cases, a part of the associated equipment serves the purpose of a fuse-base. Owing to the great variety of equipment, no general rules can be given; the suitability of the associated equipment to serve as a fuse-base should be subject to agreement between the manufacturer and the user. However, if separate fuse-bases or fuse-holders are used, they should comply with the appropriate requirements of IEC 60269 series.

NOTE 3 PV fuse-links protect down stream inverter components such as capacitors or the discharge of capacitors back into the arrays or array wiring up to the rated breaking capacity.

The object of these supplementary requirements is to establish the characteristics of PV fuse-links in such a way that they can be replaced by other fuse-links having the same characteristics, provided that their dimensions are identical. For this purpose, this standard refers in particular to

a) the following characteristics of fuses:
   1) their rated values;
   2) their utilisation category;
   3) their temperature rises in normal service;
   4) their power dissipation;
   4) their time-current characteristics;
   6) their breaking capacity;
   7) their dimensions or size (if applicable).
b) type tests for verification of the characteristics of fuses;
c) the markings on fuses.

1.2 Normative references

The following referenced documents are indispensable for the application 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 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*[1]
Amendment 1 (2009)

IEC 60269-2, *Low-voltage fuses – Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application) – Examples of standardized systems of fuses A to J*

ISO 3, *Preferred numbers – Series of preferred numbers*

2 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60269-1 as well as the following apply.

2.2 General terms

2.2.101
photovoltaic fuse-link
fuse-link capable of breaking, under specific conditions, any current value within the breaking range (see 7.5)

NOTE A PV fuse-link operates under two main conditions:

- Short-circuit in a string or in an array which leads to a very low over-current.
- Short-circuit current supplied by the discharge of the PV inverter through a very low inductance. This short-circuit condition leads to a very high rate of rise of current equivalent to a low value of time constant, corresponding to Table 104.

2.2.102
photovoltaic cell
most elementary photovoltaic device which generate d.c. voltage by the absorption of photons

[IEC 61836, 3.1.43 a) and d) modified]

2.2.103
photovoltaic module
complete and environmentally protected assembly of interconnected PV cells

[IEC 61836, 3.1.43 f)]

2.2.104
photovoltaic array, array field, assembly, generator, panel, string, sub-array

2.2.104.1
photovoltaic array
assembly of mechanically integrated and electrically interconnected PV modules, PV panels or PV sub-array and its support structure

2.2.104.2
photovoltaic array field
aggregate of all PV arrays within a given PV system focusing on the mechanical arrangement of the PV technology

2.2.104.3
photovoltaic assembly
PV components that are installed outdoors and remote from its loads, including modules, support structure, foundation, wiring, tracking apparatus, and thermal control (were specified),

[1] *There is a consolidated edition 4.1 (2009) that includes IEC 60269-1(2006) and its amendment 1 (2009).*